Concept Design Report

for

Scammon Bay Bulk Fuel Upgrades
Scammon Bay, Alaska

Prepared for:

Alaska Energy Authority
813 W. Northern Lights Blvd.
Anchorage, Alaska

Prepared by:

Owen Means
Mark Swenson, P.E.

HDL Engineering Consultants, LLC
3335 Arctic Blvd., Ste. 100
Anchorage, AK 99503
Phone: 907.564.2120
Fax: 907.564.2122

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Abbreviations

AAC	Alaska Administrative Code
ADEC	Alaska Department of Environmental Conservation
AEA	Alaska Energy Authority
ADLWD	Alaska Department of Labor and Workforce Development
ATV	all-terrain-vehicle
AVEC	Alaska Village Electric Cooperative
BFU	Bulk Fuel Upgrade
CDR	Concept Design Report
CFR	Code of Federal Regulations
City	City of Scammon Bay
Corporation	Askinuk Corporation
DGGS	Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys
EPA	Environmental Protection Agency
ESA	Endangered Species Act
F	Fahrenheit
FRP	Facility Response Plan
HDL	HDL Engineering Consultants, LLC
IBC	International Building Code
IFC	International Fire Code
NEPA	National Environmental Policy Act
NFPA	National Fire Protection Association
NHPA	National Historic Preservation Act
NVSB	Native Village of Scammon Bay
SPCC plan	Spill Prevention, Countermeasure, and Control plan
U.S.	United States
USACE	U.S. Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USCG	U.S. Coast Guard

EXECUTIVE SUMMARY

This report has been prepared for Alaska Energy Authority (AEA) to develop and evaluate options for a bulk fuel storage upgrade (BFU) project for replacement of the Askinuk Corporation tank farm in Scammon Bay, Alaska. Askinuk Corporation is the only fuel retailer in the community. Their facilities are outdated and upgrades are required to provide a code-compliant tank farm with sufficient storage capacity to support the community's retail fuel needs. The purpose of this report is to provide a conceptual design for the BFU project with associated construction scheduling and an order-of-magnitude cost estimate.

The BFU project includes the construction of a new tank farm with dispensing equipment. On June 29, 2020, Bill Price of AEA and Mark Swenson, Kent Kornegay, and Owen Means of HDL Engineering Consultants, LLC (HDL) traveled to Scammon Bay. The purpose of this site visit was to gather reconnaissance level information for preparation of this Concept Design Report (CDR) for the BFU project.

HDL evaluated three site alternatives based on concept-level engineering analyses conducted on cost effectiveness, constructability, and operability:

- Alternative 1: Hill Site. Site alternative 1 is located west of the village at the base of the hill abutting the south side of the community.
- Alternative 2: Alaska Village Electric Cooperative (AVEC) Site. Site alternative 2 is located immediately adjacent to and north of the existing AVEC tank farm.
- Alternative 3: Landfill Site. Site alternative 3 is located on the gravel pad covering the old community landfill.

HDL recommended Alternative 3 – Landfill Site as the proposed site for the tank farm construction because it is located on land owned by the Askinuk Corporation and the City; it minimizes threats from flooding, erosion, and ice damage; minimizes construction cost; and provides greater ease of maintenance and operation. The site is primarily located on the gravel pad covering the old community landfill. The site is furthest away from the river and is not threatened by ice, storms, flooding or erosion. Based on these recommendations and the needs of the community, the Native Village of Scammon Bay (NVSB), through a resolution of the Scammon Bay Traditional Council, selected Alternative 3 – Landfill Site as the preferred site. Recommended upgrades include a gravel pad, seven 27,000-gallon bulk fuel tanks, one 12,000-gallon dispensing tank, gravel secondary containment structure, and associated fuel piping. The facility will include a retail sales building, dispenser station, and a truck fill station.

The Askinuk Corporation owns and operates the community's existing tank farm. The NVSB, through a resolution of the Scammon Bay Traditional Council, has agreed to receive land and facility ownership of the new tank farm. The Askinuk Corporation and the City intend to convey land ownership of the proposed site to NVSB. The Askinuk Corporation would maintain operational control of the facility through an agreement with NVSB.

A preliminary cost estimate for construction of the new tank farm facility with gravel dikes at Alternative Site 3 is approximately $5.09M, including anticipated administration costs and 15% project contingency.

1.0 INTRODUCTION

This report has been prepared for the Alaska Energy Authority (AEA) and the Native Village of Scammon Bay (NVSB) to provide information for the development of a bulk fuel upgrade (BFU) project in Scammon Bay, AK. The Askinuk Corporation (Corporation) owns and operates the only retail fuel sales facility in Scammon Bay. The facility provides sales for unleaded gasoline and diesel #1. This report includes a review of the Corporation's existing tank farm, dispensing equipment, and supporting infrastructure; and an analysis of the community's existing and projected fuel use. This report also presents a conceptual design and cost estimate for a new bulk fuel facility (tank farm) that provides storage capacity for the estimated fuel demand in Scammon Bay for the 25-year planning horizon.

The main participants in this project include HDL Engineering Consultants, LLC (HDL), Alaska Energy Authority (AEA), Native Village of Scammon Bay (NVSB), Askinuk Corporation (Corporation), and the City of Scammon Bay (City).

On June 29, 2020, Bill Price of AEA and Mark Swenson, Owen Means, and Kent Kornegay of HDL Engineering Consultants, LLC (HDL) traveled to Scammon Bay. The purpose of this visit was to meet with local representatives, review the condition of the existing tank farm facility, and discuss options for construction of a new tank farm. The team performed a brief evaluation of three proposed tank farm sites and the community's material source. A detailed description of the site visit is provided in the Site Selection Memorandum included in Appendix A.

2.0 CONTACTS

The following individuals contributed valuable information for this report:

Bill Price	AEA, Project Manager
James Kaganak	Askinuk Corporation
James Akerelrea	NVSB
Brandon Aguchak	NVSB
Mike Poston	Vitus Marine

2.1 Applicable Regulations

The design/operation of fuel systems is controlled by the following State and Federal regulations:

- State of Alaska Fire and Life Safety regulations (Alaska Administrative Code [AAC] Title 13, Chapter 50-55)
- State of Alaska Oil and Other Hazardous Substances Pollution Control regulations (18 AAC 75)
- Memorandum of Agreement - AEA and Alaska State Fire Marshal - Dated November 2018
- 2012 International Fire Code (IFC) as adopted by 13 AAC 50-55
- 2012 International Building Code as adopted by 13 AAC 50-55
- 2015 National Fire Protection Association (NFPA) 30 Flammable and Combustible Liquids Code
- 2017 NFPA 70, National Electrical Code

- U.S. Environmental Protection Agency (EPA) Oil Pollution Prevention Regulations (Code of Federal Regulations [CFR] Title 40, Part 112)
- U.S. Coast Guard (USCG) Facilities Transferring Oil or Hazardous Material in Bulk Regulations (33 CFR Part 154)

The State of Alaska, Department of Public Safety, Division of Fire and Life Safety has adopted the 2012 edition of the International Fire Code (IFC) and the International Building Code (IBC). The provisions set forth in the IFC establish the primary design requirements for new facilities.

The EPA requires two sets of regulatory plans for fuel facilities from which a discharge could impact navigable water or adjoining shorelines. The Spill Prevention Control and Countermeasure (SPCC) Plan identifies requirements for facilities which have a minimum aggregate storage capacity of 1,320 gallons. The SPCC Plan must address every container 55 gallons and larger, and must be certified by a Professional Engineer. Facility Response Plans (FRPs) are required for facilities which are filled by marine vessels and which have a storage capacity of more than 42,000 gallons.

The USCG regulations (33 CFR Part 154) apply to fuel facilities capable of transferring fuel to or from a vessel with a capacity of 10,500 gallons or more. This regulation requires an FRP and an Operations Manual. The FRP is similar to the EPA FRP and outlines spill planning requirements for the USCG-regulated portion of the facility. The Operations Manual addresses the procedures and equipment required for receiving fuel at the facility. Additionally, USCG requires that a Letter of Intent to Operate be submitted to the Captain of the Port for approval prior to delivery of fuel.

2.2 Village Description

Scammon Bay is located on the western coast of Alaska on the south bank of the Kun River. The community lies 145 miles northwest of Bethel and 500 air miles west of Anchorage (Figure 1). The community is surrounded by the Yukon-Delta National Wildlife Refuge. Scammon Bay is at approximately 61.8419° North Latitude and 165.5811° West Longitude and is within the Bethel Recording District. Scammon Bay has a subarctic climate, with average temperatures ranging from a low of 8.3° Fahrenheit (F) to a high of 18.3° F in January and a low 45.1° F to a high of 53.0° F in July. Average precipitation is approximately 25 inches per year, with 68 inches of snowfall (Western Regional Climate Center 2020). According to the Alaska Department of Natural Resources, Division of Geological and Geophysical Surveys (DGGS), permafrost is expected to be sporadic (DGGS 2020).

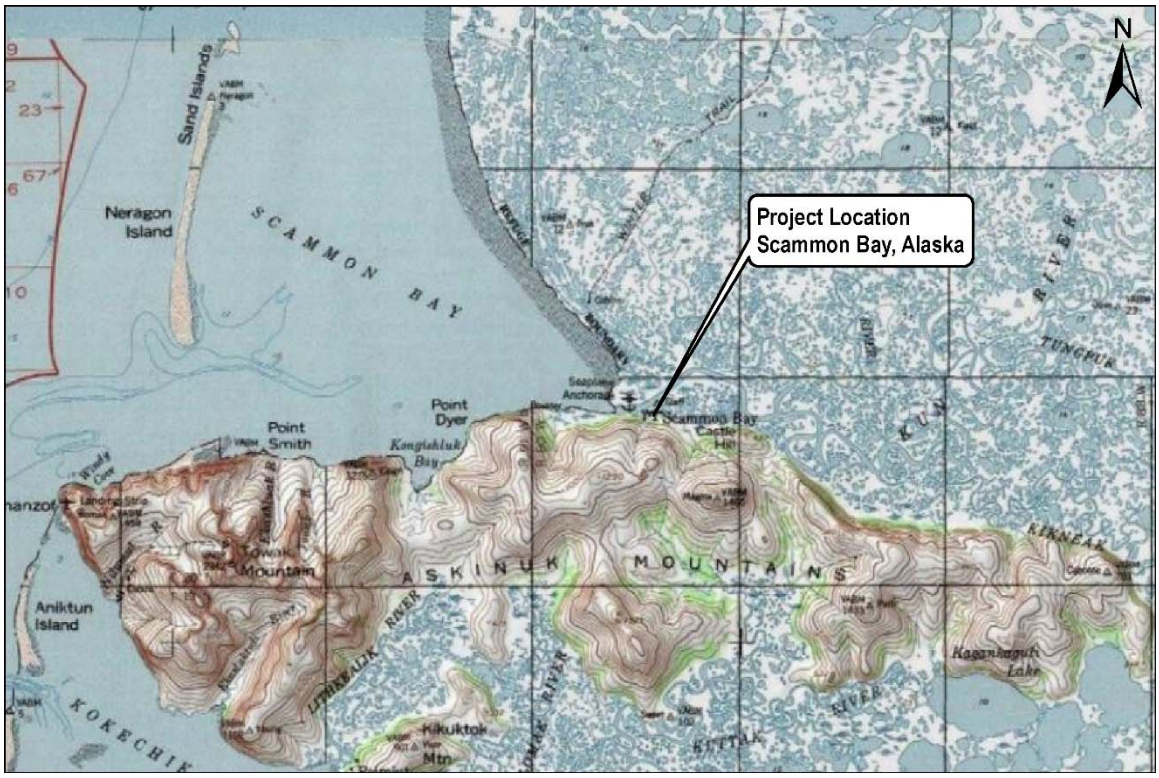


Figure 1: Scammon Bay Topographic Map

The estimated population of Scammon Bay in 2018 is 598 (Alaska Department of Labor and Workforce Development 2018). Scammon Bay is historically an Aleut village, which is supported on fishing and subsistence activities. The NVSB is a federally recognized tribe. There are no connecting roads to the community. Commercial and passenger air service is available via a 3,000-foot by 75-foot gravel airstrip. Travel between Scammon Bay and neighboring communities can be made via boat in the summer and snow machine in the winter.

3.0 EXISTING INFRASTRUCTURE

3.1 General Overview

The existing bulk fuel system in Scammon Bay includes the following components:

- Retail Sales Building
- Vehicle Dispenser
- Truck Fill Dispenser
- Bulk Fuel Tank Farm
- Marine Fill Header and Piping
- Distribution Piping

The 2017 Bulk Fuel Letter Report—Scammon Bay (LeMay 2017) provided information on the existing tank farm facilities. The existing facilities were then visually examined on June 29, 2020, to determine their condition and suitability for reuse. The following sections summarize findings of the facilities inspection.

3.2 Bulk Fuel Tank Farm

Askinuk Corporation's bulk fuel tank farm is located in low, marshy ground approximately 500 feet west of the village. The location is within the floodplain of the Kun River and is periodically subject to flooding and ice flows from storm surges originating in the Bering Sea. The community has reported that water and ice has damaged the tank farm secondary containment walls and the gravel pad during the storm surge events. There is a high likelihood that new or replacement infrastructure would continue to be damaged by future storm surges, and the elevated risk of fuel releases would remain. For these reasons, continued, long-term use of the tank farm, or reconstruction of the tank farm at its current location, is not recommended.

The tank farm consists of a lined earthen dike containing a mix of vertical and horizontal tanks, piping, and a chain link perimeter security fence. Fifteen tanks are currently in service and three are reportedly out of service. The vertical and horizontal bulk tanks are supported on timber foundations. The dual-product dispensing tank is supported on steel skids that rest directly on the ground. One of the in-service tanks is a 30,000-gallon, double-wall bulk gasoline storage tank located outside of the secondary containment. Excluding the three out-of-service tanks, the facility has a gross capacity of 66,000 gallons for diesel, 91,000 for gasoline, and a combined gross capacity of 157,000 gallons. A tank schedule is presented in Table 1.

Photo 1: Existing Askinuk Corporation Tank Farm

Table 1: Existing Askinuk Corporation Fuel Storage Capacity

Tank No.	Fuel	Capacity (gallons)		Horizontal / Vertical	Single / Double Wall	In / out of service
		Diesel	Gasoline			
1	Diesel	10,000	-	Vertical	Single	In service
2	Diesel	10,000	-	Vertical	Single	In service
3	Diesel	9,000	-	Vertical	Single	In service
4	Diesel	10,000	-	Vertical	Single	In service
5	Diesel	8,000	-	Vertical	Single	In service
6	Diesel	9,000	-	Vertical	Single	In service
7	Diesel	10,000	-	Vertical	Single	In service
8	Diesel	5,000	-	Vertical	Single	Out of service
9	Diesel	6,000	-	Vertical	Single	Out of service
10	Gasoline	-	10,000	Horizontal	Single	In service
11	Gasoline	-	10,000	Horizontal	Single	Out of service
12	Gasoline	-	10,000	Horizontal	Single	In service
13	Gasoline	-	8,000	Vertical	Single	In service
14	Gasoline	-	10,000	Vertical	Single	In service
15	Gasoline	-	10,000	Vertical	Single	In service
16	Gasoline	-	10,000	Horizontal	Single	In service
17	Dual product	3,000	3,000	Horizontal	Single	In service
18	Gasoline	-	30,000	Horizontal	Double	In service
Total In-Service Capacity:		69,000	91,000			
		157,000				
Total Out-of-Service Capacity:		11,000	10,000			
		21,000				

All in-service tanks are of welded steel construction and have no visible leaks. All tanks show signs of pitting, rust, and corrosion and many are severely dented. All tanks are in poor condition and lack the necessary appurtenances for level control and overfill protection. None of the tanks are properly listed or labeled. The tanks do not appear to be suitable for reuse and installation of new tanks is recommended for the BFU project.

The secondary containment earthen dike walls have differentially settled and eroded in some locations. The dike floor is not level and water ponds in some locations, suggesting that the liner is likely intact. Depending on the location of a spill, the uneven dike walls are unlikely to contain the volume of fuel from a major spill event.

In April 2018, approximately 7,000 gallons of gasoline was released from Tank #11. According to Alaska Department of Environmental Conservation's (ADECs) contaminated site report, the spill was caused by a hole in the bottom of the tank. The tank farm operator indicated that fuel may have flowed over a damaged portion of the containment berm into the surrounding tidal wetlands. Water containing fuel may have also been pumped from the secondary containment into the wetlands during the subsequent clean-up effort. Petroleum contamination remains in the tank farm embankment fill material. The gravel containment berm on the west side of the tank farm

has since been fortified with additional gravel and sandbags to mitigate the risk of future spills (ADEC 2020).

One 30,000 double-wall tank is located outside the tank farm containment and is reportedly used for additional gasoline storage. The tank was leftover from a past construction project and is old with visible rust and failing coatings. The tank is not listed or labeled and is not connected to the tank farm pipe manifold.

3.3 Marine Header and Pipeline

Barge delivery of fuel in Scammon Bay occurs at the marine header located along the south bank of the Kun River, approximately 550 feet north of the bulk fuel tank farm. The marine header is located approximately 50 feet from the Kun River shoreline, on property owned by the Askinuk Corporation. Fuel is delivered through a 3-inch barge header and 550-foot-long, 3-inch welded steel, below-grade, barge-offloading header pipeline that extends to the tank farm. The pipeline is reportedly intact and does not leak. However, some sections of pipe are above grade and unsupported, and located directly on the ground with no pipe supports or cathodic protection. Some sections of the pipeline have been covered with mud and vegetation. The exposed sections of pipe are severely corroded and bent from ice and storm events. The pipe is particularly bent and damaged at the unsupported pipe crossing over an unnamed anadromous tidal slough.

Photo 2: Barge Header

Photo 3: Fuel Delivery Pipeline Bending Caused by Flooding and Ice Surges

3.4 Distribution Piping

The header is connected to the distribution piping via a short section of 3-inch diameter soft hose. The existing distribution piping consists of a 3-inch welded steel pipe manifold with flanged steel isolation valves connected to the bottom of each bulk tank. Flex fittings are installed between the pipe manifold and isolation ball valves. The manifold includes separate pipelines for gasoline and diesel distribution that are connected to the top of the 6,000-gallon, dual-product dispensing tank. Fuel is pumped from the bulk storage tanks to each side of the dispensing tank using two exterior mounted centrifugal pumps located on the north end of the dispensing tank. An additional soft hose is connected to the gasoline manifold pipe which also runs to the gasoline side of the dispensing tank. A soft hose is also connected to the double-wall gasoline tank located outside of the containment. The hose is used to transfer gasoline from the double-wall tank to the dispensing tank via a portable transfer pump. Fuel is supplied to the dual-product dispenser by submersible pumps mounted on top of the dispensing tank via 2-inch above grade welded steel pipelines for each product. The distribution and dispensing pipelines are old and corroded and are not suitable for use in the new tank farm facility.

3.5 Retail Sales Building

Fuel sales is performed at the Askinuk Corporation store and office building located approximately 500 feet from the existing tank farm. The store manages the retail operations for gasoline and diesel and sells a variety of goods and consumables to Scammon Bay residents.

3.6 Vehicle Dispenser

Vehicular dispensing is performed by one dual product gasoline and diesel dispenser located in a small metal and chain link enclosure approximately 50 feet south of the tank farm. The dispenser

is reportedly operational but is old and outdated. The Corporation desires a new dispenser at the new tank farm with credit card reader capabilities for remote sales.

3.7 Facility Deficiencies

The existing Askinuk Corporation tank farm is in poor condition, has inadequate containment, is located in the floodplain, and is threatened by ice flows on a yearly basis. The tanks, pumps, and piping are beyond their useful life and are severely corroded. The facility is not code-compliant and is a high risk for a fuel spill. A spill from a ruptured tank could overtop the damaged and settled sections of the dike and reach navigable waters of the United States and detrimentally impact sensitive coastal wildlife habitat. The facility needs to be decommissioned as soon as possible to avoid a major spill event. The existing tank farm and piping components should be removed and properly disposed of and not reused in the new tank farm facility.

4.0 FUEL USE AND DESIGN CAPACITY

The existing Askinuk Corporation tank farm primarily provides fuel for retail sale to support land and marine transportation and home heating. The facility typically receives deliveries of both diesel and gasoline in the spring and the fall, after break up and prior to freeze up.

4.1 Historical Fuel Use

The Askinuk Corporation and Vitus Marine provided fuel delivery data for the years 2013-2019 (Table 2). According to the fuel delivery data, the facility typically receives on average 128,699 gallons of fuel per year (52,912 gallons diesel and 75,787 gallons gasoline). Gasoline is used by all-terrain vehicles (ATVs) and small marine vessels and diesel is used for home heating. Gasoline consumption is consistently higher than diesel and is reportedly greatest in the summer when ATV use and fishing are at their peak. Diesel fuel use is generally greatest between September and April.

Table 2: Existing Fuel Delivery and Retail Sales Data

Year	Diesel #1 (gallons)	Gasoline (gallons)	Total annual (gallons)
2013	70,000	78,505	148,505
2014	54,471	75,000	129,471
2015	58,974	70,005	128,979
2016	36,833	90,000	126,833
2017	50,106	64,999	115,105
2018	40,000	95,003	135,003
2019	60,000	57,000	117,000
Seven-year average	52,912	75,787	128,699

4.2 Recommended Fuel Storage Capacity

Scammon Bay has experienced steady population growth between 1980 (pop. 250) and 2018 (pop. 598) (Alaska Department of Labor and Workforce Development [ADLWD] 2018). The

ADLWD projects the total population of the Kusilvak Census Area, where Scammon Bay is located, will increase from 8,333 persons in 2018 to 11,105 in 2045, an annual growth rate of 1.07 percent (ADLWD 2018). Using the 1.07 percent annual growth rate, the projected population in Scammon Bay will increase from 598 in 2018 to 797 in 2045.

Fuel storage calculations were performed based on the seven-year average of available fuel delivery data for 2013 through 2019, and adjusted for projected population growth in the community. The fuel storage projection uses a design year of 2045 (25 years). The projection assumes that all fuel sold is consumed by the community for the identified uses of home heating and ATV and small marine vessels, and the proportion of fuel demand for Diesel and gasoline will remain constant in the future. Other than those resulting from projected population growth, there are no new facilities or projects planned or known by the community that would add additional fuel demand. Construction projects, such as planned improvements to the Scammon Bay Airport and water/sewer infrastructure, require a significant quantity of fuel for operating equipment; however, we assume the construction contractor would be responsible for supplying their own fuel and would not rely on the local fuel supply.

Using an annual growth rate of 1.07%, the projected fuel demand in Scammon Bay will increase from the current seven-year average of 128,699 gallons to 167,901 gallons in 2045. The projected demand for Diesel #1 will increase from the current seven-year average of 52,912 gallons to 69,029 gallons in 2045, and the projected demand for gasoline will increase from 75,787 gallons to 98,872 gallons in 2045. Assuming 90 percent of useable capacity per tank, the projected fuel storage required in 2045 is 76,699 gallons diesel and 109,858 gallons gasoline (186,557 gallons aggregate).

For this project, 27,000-gallon horizontal tanks were chosen for bulk fuel storage. Such tanks are widely produced, commonly available, and have been successfully implemented in similar AEA projects throughout the state. Table 3 calculates the number of 27,000-gallon horizontal tanks required by dividing the projected fuel demand by the capacity of the proposed tanks.

Table 3: Proposed Fuel Storage

	Diesel	Gasoline
Projected annual fuel demand (gallons)	76,699	109,858
	186,557	
Number of proposed 27,000-gallon tanks	3	4
Gross bulk tank storage capacity (gallons)	81,000	108,000
	189,000	
Goss dispensing tank capacity (gallons)	6,000	6,000
Gross tank farm capacity (gallons)	87,000	114,000
	201,000	
Usable tank farm capacity (gallons) [1]	78,300	102,600
	180,900	

[1]Calculated as 90% of Gross Capacity.

It is recommended that three 27,000-gallon bulk tanks and one 6,000-gallon dispensing tank be provided for diesel storage and four 27,000-gallon bulk tanks and one 6,000-gallon dispensing tank be provided for gasoline storage. This tankage will provide 78,300 gallons of usable diesel storage, which meets the projected yearly demand for design year 2045. Approximately 102,600 gallons of gasoline storage will be available, which is approximately 7,300 gallons less than the projected annual demand for the design year. However, Scammon Bay currently receives fuel twice per year; once in the early summer and once in the fall. With two deliveries possible, the tank farm only needs a minimum of 10 months of gasoline storage on hand. The 102,600 gallons of useable gasoline storage provided exceeds the estimated 10-month demand of approximately 90,000 gallons and provides sufficient capacity to accommodate the retail gasoline sales needs of the community. Additionally, the proposed tank farm will be provided with additional space in the containment for installation of one additional 27,000-gallon diesel tank and one additional 27,000-gallon gasoline tank. These additional tanks may be installed in the containment in the future if additional capacity is required. A summary of the recommended storage capacity is outlined in Table 3 above.

5.0 PROPOSED NEW FACILITY

A new tank farm is needed in Scammon Bay to replace the Askinuk Corporation Tank Farm that is recommended for decommissioning and to meet the estimated projected fuel demand discussed above. The proposed new facility will be comprised of the following components:

Bulk Fuel Tank Farm

- Three 27,000-gallon diesel bulk fuel tanks
- Four 27,000-gallon gasoline bulk fuel tanks
- One 12,000-gallon dual product dispensing tank
- On-grade secondary containment structure with earthen/gravel berm or timber dike walls
- Gravel pad foundation
- Dual product vehicle dispenser
- Small retail sales building

- Dual product truck fill dispenser with containment sump
- Truck fill and vehicle dispensing distribution piping

A detailed description of each design element is included in Section 6 of this report.

6.0 SITE SELECTION

6.1 Site Alternatives

HDL prepared a Site Selection Memorandum that presented and evaluated site alternatives based on concept-level engineering analyses conducted on cost effectiveness, constructability, and operability (Appendix A). AEA provided the memorandum to the NVSB, as the primary project participant, to assist NVSB in the decision-making process in selecting a preferred site. The memorandum examined the following tank farm site alternatives:

- **Alternative 1: Hill Site.** Site alternative 1 is located west of the village at the base of the hill abutting the south side of the community.
- **Alternative 2: AVEC Site.** Site alternative 2 is located immediately adjacent to and north of the existing AVEC tank farm.
- **Alternative 3: Landfill Site.** Site alternative 3 is located on the gravel pad covering the old community landfill.

Other site alternatives, (1) to the north of the sewage lagoon and (2) at the existing basketball court, were considered initially, but were determined to not be practicable. The sewage lagoon site would require significant fill to construct a pad and a longer marine header pipeline than Site Alternative 1 and Site Alternative 2. The basketball court site would require an agreement with the Alaska Department of Transportation and Public Facilities for access from the airport road, which is prohibited under Federal Aviation Administration rules. The sewage lagoon and basketball court sites were dismissed from further consideration.

The Site Selection Memorandum evaluated the three tank farm alternatives based on availability of property; marine header construction; minimizing threats from flooding, erosion, and ice damage; pad construction; site access; ease of maintenance and operation; and minimizing construction cost. An alternatives analysis is included in the Site Selection Memorandum in Appendix A.

6.1.1 Recommended Site

Alternative 3 – Landfill Site was selected as the recommended site for tank farm construction because it is located on land owned by the Askinuk Corporation; it minimizes threats from flooding, erosion, and ice damage; minimizes construction cost; and provides greater ease of maintenance and operation. The site is primarily located on the gravel pad covering the old community landfill. During the site investigation, NVSB representatives suggested including this site as an alternative. The site is furthest away from the river and is not threatened by ice, storms, flooding or erosion.

There are two options for filling tanks installed at this recommended site: (1) Construction of an approximately 4,000-foot barge header pipeline to receive fuel from barge transfer, or (2)

constructing a truck fill and trucking fuel from the barge. Due to land availability, the barge header pipelines would need to run through the village along community roads. Pipeline installation would likely require relocation of existing utilities and disrupt vehicle and pedestrian traffic during construction. Vitus Marine has reported that pipelines of that length cannot be purged efficiently due to pig degradation over the length of the pipe. The pipeline would likely not be purged after each use and would remain charged between fuel deliveries. A significant amount of fuel would remain in the pipeline that could result in a major spill if the pipe is damaged or ruptured. The cost of a marine header and pipeline for Site 3 would be an additional $2,500,000. Due to the operational concerns with fuel remaining in the pipes and the cost of construction and maintenance of these long header pipelines, filling the tank farm by trucking fuel from the barge is preferred.

The Lower Yukon School District tank farm, located approximately 600 feet east of the proposed tank farm site, currently receives fuel deliveries via fuel truck. Preliminary conversations with fuel providers indicates that truck transfers from the barge to the tank farm are not preferred due to increased maintenance requirements and significantly shorter lifespans for fuel trucks due to exposure to the marine environment. Fuel cost considerations associated with trucking fuel include a surcharge added to the rate charged by regional fuel providers. Preliminary conversations with the Askinuk Corporation's current fuel provider indicated that an approximately $0.25 - $0.35 per gallon surcharge for trucking can be expected to be added to the base fuel price to account for long-term additional labor and maintenance and replacement costs associated with the fuel delivery truck.

Based on the recommendations contained in the Memorandum and the needs of the community, the NVSB, through a resolution of the Scammon Bay Traditional Council, selected Alternative 3: Landfill Site as the preferred site. A copy of Scammon Bay Traditional Council Resolution 20-08-11-3 is included in Appendix B. Alternative 3 is the proposed site for the new tank farm facility. A topographical survey of the proposed site was performed in early September 2020 and the geotechnical field investigation was performed in late September 2020.

6.2 Site Control and Right-of-Way

The tank farm at the recommended site would be constructed on the existing gravel pad above the old community land fill. The landfill pad will likely need to be extended to the north and the east to provide an adequate pad foundation for the tanks. The site is currently located on land owned by the Askinuk Corporation. A portion of the site lies within a Waste Disposal Site Right-of-Way Easement Parcel granted to the City in 1987 for the purpose of construction, maintenance, and ongoing management of a waste disposal site. Since that time, the property was used for a landfill until the site was closed and capped. The Deed of Easement Document has a certification paragraph that stipulates the condition that the Grantee(s) continue using the easement parcel for the purpose specified. A consecutive two-year gap of not using the property for landfill purposes may result in the easement being terminated in whole or in part by the Askinuk Corporation. It remains to be determined if the City has been using and/or plans to continue the use of the property for landfill purposes. If the City is using the property for landfill purposes, any ongoing requirements or needs of the City for the completion of its use of the property as a landfill will have to be determined. How any ongoing needs they might have would interact with the site

being used for the tank farm would also have to be determined. The site would possibly require the acquisition of a joint use agreement for the portion of the land currently held in easement by the City relative to the landfill. A property interest for the tank farm in the form of a ROW Easement or platted parcel of land would need to be discussed and agreed upon between the Askinuk Corporation and the NVSB. The size of the parcel will be driven by the design needs, and will need to be reviewed and agreed upon by both the Askinuk Corporation and the NVSB. A conveyance document formalizing the agreement between the Askinuk Corporation and the NVSB would need to be prepared and recorded. The site would require coordination with the ADEC, Division of Solid Waste to ensure that no waste is excavated during construction over the top of the old landfill site.

7.0 TANK FARM DESIGN

The proposed tank farm configuration is based on the recommended total tank farm capacity of 201,000 gallons, the proposed new facilities described in Section 4.0, and construction of the new tank farm at the proposed Site Alternative 3: Landfill Site. Preliminary survey and geotechnical field work has been completed at the site in September 2020. Conceptual design drawings of the tank farm layout are presented in Appendix C. Due to the condition and age of the existing Corporation tanks, only new tanks were considered for inclusion in the new facility.

7.1 Tank Selection

The bulk and dispensing tanks will be constructed to meet the specifications of UL 142 Steel Aboveground Tanks for Flammable and Combustible Liquids, which requires that all tanks be shop fabricated. Shop-built, horizontal 27,000-gallon, single-wall, bulk tanks are preferred for this project based on their common availability and the fact that cranes and specialty equipment are not required to move and position the tanks. Also, differential settlement of the bottom of the containment cell may be experienced due to portions of the tank farm being constructed above the old community landfill. The foundations for the horizontal tanks will be designed such that the load can be spread over a larger area to reduce the potential for settlement; and the tanks can be easily releveled if settlement occurs. Shop-built tanks are preferred because they allow for greater quality control during fabrication and coating.

7.2 Tank Farm Layout

The tank farm will be constructed on an approximately 200-foot-wide by 200-foot-long gravel pad, partially overlapping the old community landfill gravel cap. The pad will include a gravel berm or timber wall perimeter containment dike, fuel-resistant membrane liner, and drainage sumps. An intermediate dike will be installed to separate the containment into two cells. The northern cell will include three 27,000-gallon bulk tanks and one 12,000-gallon dispensing tank. The southern cell will include four 27,000-gallon tanks. Both cells include room for an additional 27,000-gallon tank to accommodate future expansion. A plan view of the tank farm layout and secondary containment area is shown in the conceptual drawings in Appendix C.

Two sets of stairs over the exterior dike walls and one set of stairs over the intermediate dike wall will provide emergency egress and access for operations and maintenance personnel. A 6-foot-tall chain link fence with a barbed wire top and locking gates at exterior stairs will surround the

tank farm pad to secure the area. Onsite storage of spill response equipment is required by federal and state regulations and will be stored within a new connex container outside the containment area.

Light fixtures/poles will be set on pads formed within the secondary containment walls, at the dispensing and fill stations, and at the retail sales area for security lighting. Security lighting will use LED-type fixtures with manual control switches located at the entry points to the containment area. Lighting will be concentrated in areas requiring normal access for maintenance, operations, and inspection (control panels, stairs, ladders, valves, gauges, etc.).

7.3 Secondary Containment

The 2012 IFC and 2008 NFPA define secondary containment requirements for bulk fuel storage facilities. The capacity of the secondary containment (excluding the displaced volume of tanks) shall contain the volume of the largest tank in the containment area and the volume of water accumulated from a 25-year, 24-hour rainfall event. According to the National Oceanic and Atmospheric Administration's Atlas rainfall data, the 25-year, 24-hour rainfall event in Scammon Bay is 2.73 inches. The containment will also provide an additional 12 inches of freeboard volume to accommodate snow and rainwater accumulation between periodic removals by pumping.

Impermeable containment will be provided with a combination of geotextile and fuel resistant liners with gravel bedding. The liner will be field seamed when necessary to provide impermeability. Drainage sumps, with manual operation, will be installed within each containment to allow rainwater purging from within the dike walls.

An 18-inch-high intermediate dike wall will be constructed to separate the containment into two cells, with a maximum allowable fuel storage capacity of 150,000 gallons per cell. The intent of the intermediate dike is to contain minor spills from the individual tanks in each cell. The bulk fuel storage within the northern cell is 93,000 gallons (three 27,000-gallon bulk tanks and one 12,000-gallon dispensing tank) and the bulk fuel storage within the southern cell is 108,000 gallons (four 27,000-gallon bulk tanks). The maximum bulk storage capacity including future tank expansion is 120,000 gallons in the northern cell and 135,000 gallons in the southern cell.

Secondary Containment Alternatives

This CDR evaluates two alternatives for the exterior dike walls that form the perimeter of the tank farm secondary containment: (1) gravel berm and (2) timber dike wall.

Alternative 1: Gravel Berm

Secondary containment Alternative 1 would use a gravel berm around the tank farm perimeter. The exterior containment walls will be 36 inches high measured from the containment floor. The containment design includes more than 12 inches of freeboard to contain the 25-year, 24-hour rain event and additional water storage due to accumulations of snow and ice and potential lapses in maintenance schedules. Gravel berm construction would consist of 2:1 horizontal:vertical inside slopes and 3:1 outside slopes. The intermediate dike would have 2:1 slopes. Interior slopes will

be stabilized with cellular confinement grid filled with imported crushed stone or low strength concrete. Exterior slopes will be topsoiled and seeded.

Gravel berm secondary containment structures are typically easier to maintain than timber dike walls. Maintenance and repair can typically be performed with hand shovels and does not require carpentry or cutting sheet metal. However, a gravel berm would result in a larger overall gravel pad and the cost is anticipated to be slightly more expensive than the timber dike wall alternative.

Alternative 2: Timber Dike Wall

Secondary containment Alternative 2 would use a timber framed dike wall around the tank farm perimeter. The exterior containment walls will be 36 inches high measured from the containment floor. The containment design includes more than 12 inches of freeboard to contain the 25-year, 24-hour rain event and additional water storage due to accumulations of snow and ice and potential lapses in maintenance schedules.

Timber wall construction would consist of horizontally stacked 6-inch by 6-inch pressure-treated timbers with 8-inch by 12-inch pressure-treated exterior vertical support posts. The fuel-resistant liner would extend to the top of the dike wall. Exposed section of liner would be covered with a layer of 16-gauge galvanized sheet metal. Timber dike walls would reduce the size of the tank farm pad footprint by approximately 10,000 square feet, when compared to the gravel dike alternative, because of the reduced gravel volumes required for dike walls. Dike wall foundations will consist of shallow concrete spread footings or timber pilings embedded a minimum of 6 feet below ground.

The feasibility of constructing timber dike walls at the recommended site will need to be in the site-specific geotechnical analysis and foundation recommendations for the project. Timber walls may not be feasible over portions of the tank farm constructed above the old landfill, because of the potential for differential settlement and the fact that excavation of landfill refuse for pile installation is not encouraged by ADEC. If feasible, the use of timber dikes is recommended because they provide a dike material that is not subject to erosion from wind or water. The use of timber dike walls is permitted by the 2018 Memorandum of Agreement between the AEA and the Fire Marshall. However, each installation must be applied for as a waiver condition in the Fire Marshall Permit application.

Secondary containment Alternative 2: Timber Dike Wall is estimated to decrease the construction cost of the tank farm by approximately $12,500.

Proposed Secondary Containment

Preliminarily Alternative 1: Gravel Berm is considered as the basis for design. Based on the stability and ease of maintenance and repair, this alternative provides the tank farm operator with a code-compliant tank farm in the long term.

7.4 Vehicle Dispensing

Vehicle dispensing equipment is anticipated to include a new dual product dispenser, dispenser curb base, drainage sump with leak detection, and an enclosed structure. The dual product dispenser will provide dispensing for diesel and unleaded gasoline. The dispenser will be clearly labeled to prevent diesel dispensing into motorized vehicles. The dispenser will have a fleet card reader, PCI card reader, and automatic shutoff nozzle for prepay services.

7.5 Truck Fill Dispensing

A truck fill dispenser will be located next to the tank farm fuel containment dike and will include a spill containment sump and truck fill rack. The spill containment sump will be installed on an elevated gravel pad and will be designed to hold the contents of the fuel truck or to allow the containment sump to drain into one side of the tank farm fuel containment area. Wood timbers will be installed across the open sump to provide drive-through access to the truck fill fuel dispenser for wheeled or tracked vehicles. Bulk diesel fuel transfer operations will be provided for service deliveries for construction equipment and large volume diesel fuel storage tanks in the village.

7.6 Distribution Piping

Fuel from the 27,000-gallon bulk tanks will be transferred to the dispensing tank with centrifugal transfer pumps located within separate pump box enclosures. Transfer piping between bulk and dispensing tanks will include automated positive shutoff valves to prevent siphoning of bulk tanks when transfer pumps are not operating. Submersible pumps installed on the dispensing tank will provide fuel service to the dispensers. The piping system will include required automated positive shutoff valves along with passive leak monitoring. Controls will include a relay-based control panel which will monitor the levels in the dispensing tank and provide operator interface for fuel transfer operations. Emergency stop pushbuttons will be located to provide shutoff of pumping operations at the egress from the containment area.

7.7 Geotechnical Considerations

The proposed bulk fuel storage site is located at the base of the north facing slopes of the Askinuk Mountains, at the edge of the Kun River lowlands. A portion of the site is located over a closed landfill that has been capped with gravel that reportedly contains large boulders. The results of the geotechnical investigation indicate that the shallow portions of the landfill cap consists primarily of highly frost susceptible silty sand with gravel. The residents of Scammon Bay indicated that the gravel pad appears to be stable and no settlement has been noted. A portion of the bulk fuel storage will extend beyond the limits of the landfill cap into lowland areas where vegetation and deep organic soils up to 4.1 feet thick may be encountered. Landfill waste was encountered during the geotechnical investigation at depths ranging from 0.8 to 3.5 feet below ground surface and ranged in thickness from 0.3 to 3.0 feet thick. Landfill waste including old cars and large metal pieces were visibly protruding in the vegetation on the north side of the existing gravel pad. See Appendix D the Scammon Bay Bulk Fuel Upgrades Geotechnical Engineering Report.

Landfill Regulatory Requirements

The waste beneath the landfill cap is regulated by the Alaska Department of Environmental Conservation (ADEC) under AAC Title 8, Chapter 60. Preliminary coordination with ADEC regarding construction of a new tank farm over the landfill and geotechnical evaluation of the landfill cap resulted in the following management guidelines that will be implemented during project design (ADEC 2020):

- Waste brought to the surface while advancing boreholes or excavations must be disposed of in the community's currently permitted landfill, and any holes or excavations in the gravel cap must be backfilled and compacted.
- The landfill gravel cap should consist of at least 2 inches of cover over the waste in addition to the tank farm's structural gravel pad.
- The tank farm gravel pad should be designed to avoid additional settlement within the landfill waste.

7.8 Tank Farm Foundation

We anticipate that the horizontal tanks will be supported by a shallow grade beam foundation system that is continuous and reinforced along the length of the tanks. Foundations should be embedded a minimum of 0.5 feet below finished grade and be a minimum of 18 inches wide for the entire length of the tank. Additional tank design consideration may be necessary to reduce the potential for settlement over the old landfill.

HDL recommends construction of a gravel "working" pad and driveway to support construction, maintenance, and emergency response operations.

7.9 Community Tsunami and Flood Data

The USACE and ADCCED do not have flood reports, insurance studies, or flood monitoring data available for Scammon Bay. The community is located at the edge of the Kun River lowlands. The community reported that the Kun River periodically floods during storms. In November 2013, a Bering Sea storm surge caused significant damage to the airport, Corporation-owned bulk fuel storage area, and other structures at the northeast edge of the village. The majority of the community, including the proposed tank farm site, is built above and east of the historical Kun River flood areas and is not subject to flooding.

7.10 Seismic Data

The community is located in an area with low seismic activity. There are no known faults or rupture patches within approximately 150 miles of the community. The expected seismic design parameters are provided in the following table.

Table 4: Seismic Design Criteria

IBC 2015 Seismic Design Criteria	Value
Spectral Response at Short Periods, S_S	0.215
Spectral Response at 1-Second Period, S_1	0.09
Site Class	D
Site Coefficient F_a	1.6
Site Coefficient F_v	2.4
Site Adjusted Spectral Response at Short Periods, S_{MS}	0.344
Site Adjusted Spectral Response at 1-second Periods, S_{M1}	0.216

7.11 Local Fill Material

Aggregate fill is available from a road-accessible quarry approximately one mile southeast of the proposed bulk fuel storage site. The quarry appears to be within an intrusion containing highly weathered granite. The quarry generally produces sand with cobbles and small boulders. Laboratory testing performed on a sample recovered from the quarry wall indicated the material is primarily sand with gravel. The quarry material appears to be suitable for some of the materials for this project but additional testing may be required to confirm suitability.

Askinuk Corporation owns the surface and subsurface rights to the site and has pledged to waive royalty fees for material used for this project.

7.12 Electrical Requirements

AVEC is the local electrical utility company in Scammon Bay. AVEC currently has both a three-phase primary and single-phase secondary overhead power line running along the road south of the proposed landfill site. The new fuel farm will require a new 240/120V, single-phase electrical service to power the fuel transfer pumps, dispensing pumps, area lights, control equipment, and retail sales building. A new service request application will need to be submitted to AVEC for this. An approximately 240-foot power line extension will be necessary from the existing overhead primary line to the new fuel farm. It is anticipated that the line extension will include a single-phase transformer, one intermediate pole, a service stub-pole, and associated anchors and guy wires. A utility easement will be required for this line extension.

In addition to the AVEC line extension, the new fuel farm will require electrical service and power distribution equipment. This will consist of a service meter/main device, main distribution panel, and feeders/branch circuits to the fuel farm, retail sales building, and vehicle dispenser and truck fill stations.

7.13 Spill Response Regulatory Plans

Spill Response and Regulatory Plans will include an EPA FRP (required for all tank farms with more than 42,000 gallon capacity, which are filled from a vessel), an EPA SPCC Plan, a USCG FRP, and a USCG Operations Manual.

Regulatory Plan Implementation Schedule:

- USCG FRP submittal required 60 days prior to receiving fuel.
- The EPA SPCC Plan must be prepared prior to receiving fuel.
- USCG Operations Manual and Letter of Intent submittal required 60 days prior to receiving fuel.

8.0 ENVIRONMENTAL CONSIDERATIONS AND PERMITTING REQUIREMENTS

8.1 Environmental Resources

HDL conducted preliminary research using the most current available data from state and federal agencies and a review of previous studies to identify environmental resources within the proposed project vicinity. The purpose of the preliminary research is to assist in identifying permitting and regulatory requirements and to ensure environmental considerations are adequately addressed during design of the proposed project. The sections below discuss environmental categories with resources potentially present in the project area.

Wetlands & Waters of the U.S.

Wetland mapping from the U.S. Fish & Wildlife Service (USFWS) National Wetlands Inventory is not available for the project area. Field observation during a site visit in June 2020, indicated the project area contains wetlands under U.S. Army Corps of Engineers (USACE) jurisdiction beyond the existing landfill embankments. Expansion of the existing gravel pad is anticipated to require authorization under a USACE Nationwide General Permit or Individual Permit. A wetland delineation report prepared using field data collected during the June 2020 site visit will be prepared and appended to the project's National Environmental Policy Act (NEPA) document.

Cultural, Historic, Pre-Historic, and Archaeological Resources

The proposed tank farm layout is anticipated to involve new ground disturbance beyond the existing landfill embankments. Identification efforts for the proposed project include a desktop assessment that will identify known cultural resources in the vicinity of the project area and provide recommendations for further evaluation.

Threatened & Endangered Species

A review of the USFWS's Information for Planning and Consultation website indicates there is one species listed as endangered under the Endangered Species Act (ESA) that is known to inhabit the project area: Spectacled Eider (*Somateria fischeri*). Mitigation measures to minimize adverse impacts to ESA-listed species include avoiding wet tundra habitat used by the species.

Migratory Birds

Several species of migratory birds are known to occur or nest in the vicinity of the project area. The proposed project is anticipated to involve new ground disturbance beyond the existing landfill embankments in shrub habitat. To avoid disturbance to migratory bird species, USFWS

recommends avoiding vegetation clearing between May 5 and July 25 (shrub or open habitat) in the Yukon-Kuskokwim region of Alaska.

Land Use

The proposed tank farm will be constructed over portions of the existing landfill that has been closed and capped with gravel. Landfills are regulated by the ADEC Solid Waste Program under 18 AAC 60. Industrial use of closed landfills is allowable under 18 AAC 60 provided the waste remains contained.

8.2 Environmental Review and Permitting Requirements

National Environmental Policy Act Review

The proposed project is federally funded through the Denali Commission and must comply with the Denali Commission's NEPA requirements under 45 CFR 900.

NEPA Class of Action Determination

The project will construct new bulk fuel storage infrastructure consisting of approximately 1 acre of useable space at the new location. The project does not appear to meet the criteria for preparation of a Categorical Exclusion for the following reasons:

- The site utilizes existing infrastructure (landfill pad); however, capacity of the tank farm containment area is approximately doubled from the existing tank farm currently in operation. (45 CFR 900, Appendix A, Paragraph B3(a)).
- The site is for infrastructure of greater than 12,000 square feet of useable space. (45 CFR 900, Appendix A, Paragraph B3(b)).

HDL recommends preparation of an Environmental Assessment to satisfy the Denali Commission's NEPA compliance requirements. It is anticipated that the Denali Commission will delegate responsibility for conducting consultation with federal agencies under Section 106 of the National Historic Preservation Act (NHPA) and Section 7 of the ESA to AEA and HDL.

Environmental Permitting

Table 5 summarizes environmental permits and approvals that may be required requirements for the project.

Table 5: Summary of Anticipated Environmental Reviews, Permits, and Authorizations

Resource	Agency	Action
NEPA Document and Consultations		
NEPA Document	Denali Commission	EA
Cultural Resources	Alaska Office of History and Archaeology State Historic Preservation Officer	NHPA Section 106 Consultation
Threatened & Endangered Species	USFWS	ESA Section 7 Consultation
Construction Permits		
Wetlands/Waters of the U.S.	USACE	Section 404 Individual Permit
Stormwater discharges	ADEC	Alaska Pollutant Discharge Elimination System Construction General Permit

9.0 CONSTRUCTION AND OWNERSHIP

9.1 Construction Methods

The project is anticipated to be delivered through competitive public bid. Tank farm construction will include the following general sequence of work:

- Mining local fill material for pad construction.
- Clearing and grubbing vegetation.
- Installing geotextile and insulation (if required).
- Placement and compaction of local fill material for pad construction.
- Installing gravel or timber containment dikes, fuel resistant liner.
- Installing new bulk and dispensing fuel tanks, manifold and distribution piping, and dual product dispenser, truck fill, and retail sales facilities.
- Installing stairways, fencing, lighting, and other related improvements.

9.2 Existing Tank Farm Decommissioning

Decommissioning of the Askinuk Corporation's existing tank farm is recommended once the new tank farm is operational. Fuel will need to be transferred from the existing tank farm to the new tank farm. If funding is available during construction, the existing tanks, piping, and fueling equipment will need to be properly cleaned and demolished, and disposed of at an approved solid waste acceptance facility. Contaminated materials may be required to be transported to a facility outside the community in accordance with ADEC regulations (18 AAC 60).

The existing tank farm gravel pad and secondary containment berms are noted by the ADEC Contaminated Sites Program as containing fuel-contaminated soils resulting from an April 2018 fuel spill. The Askinuk Corporation is currently developing plans to characterize the site contamination and remediate the site. Removal of the existing tank farm gravel pad and secondary containment will not be included in the scope of the new tank farm construction and environmental cleanup of the site to meet ADEC cleanup requirements is the responsibility of the Corporation.

9.3 Local Equipment and Labor

City Manager, Larson Hunter, has indicated the City has limited construction equipment available for rent. A WA250 Komatsu loader and Case CX80 excavator are in working condition and available for rent at $200 per hour without operator or $285 per hour with operator. The City also has a 10 cubic yard dump truck and a larger excavator that require mechanical work.

The City maintains a list of local labor resources. The City Manager has indicated there are six community members with Commercial Driver Licenses capable of operating equipment. A limited number of tradespeople certified in welding and electrical are available.

9.4 Schedule

The following design and construction schedule assumes materials will be delivered by barge from Seattle and Anchorage to Scammon Bay. Fill material will be mined from the existing material site in Scammon Bay. The proposed schedule is dependent upon project funding, project design NTP, construction project start date, material availability, weather, and other factors. Procurement or shipping delays could cause the project to run longer than anticipated. An anticipated project schedule is presented in Table 6.

Table 6: Anticipated Project Schedule

Work Description	Approximate Start / End
Pre-Construction Activities	Fall 2020 / Winter 2020/21
Design Survey	Fall 2020
Geotechnical Evaluation	Fall 2020
Environmental Permitting	Winter 2020/21 / Summer 2021
Final Design	Winter 2020/21 / Summer 2021
Bid Project and Award Contract	Fall 2021
Tank Farm Construction	Spring 2022 / Fall 2022
Material Procurement	Spring 2022 / Summer 2022
Pad Construction	Summer 2022
Fabricate Tanks	Spring 2022
Build Containment	Summer 2022
Construct Piping and Dispensers	Summer 2022
Deliver Tanks	Late Summer 2022
Final Completion	Fall 2022

9.5 Cost Estimate

A cost estimate has been prepared for development of the proposed tank farm at the old landfill location (Site Alternative 3) using gravel berm dike secondary containment (Secondary Containment Alternative 1) as presented on the conceptual design drawings. The estimate is based on historical construction costs for recent tank farm projects and civil construction projects in western Alaska. The cost is based on 201,000 gallons of fuel storage for the tank farm, including dispensing tanks, secondary containment, site civil, mechanical, and electrical work. The

preliminary cost estimate for the project is approximately $5.09M. Approximately $12.5K of saving would be realized if timber dike walls were constructed in place of gravel containment dikes. This estimate includes administration costs and a 15% project contingency. A detailed cost estimate is presented in Appendix E.

Detailed cost estimates for dismissed alternatives (Site Alternative 1: Hill Site, Site Alternative 2: AVEC Site) were not developed for this report.

9.6 Ownership and Operation

The Askinuk Corporation owns and operates the community's existing retail sales tank farm. The NVSB, through a resolution of the Scammon Bay Traditional Council, has agreed to take over ownership of the new tank farm. The proposed new tank farm is located on land containing possible joint interest by the by the Askinuk Corporation and the City. The Askinuk Corporation and the City intend to covey site control of the required tank farm parcel to NVSB. The Askinuk Corporation would continue to operate and maintain the facility through an agreement with NVSB. Responsibility for upgrades required for long-term usability or code compliance will need to be determined through agreement between the parties. As of this date, no operations agreements or transfers of ownership between the parties have been executed. A copy of Scammon Bay Traditional Council Resolution 20-08-11-3 is included in Appendix B.

10.0 CONCLUSION AND RECOMMENDATIONS

The existing Askinuk Corporation tank farm in Scammon Bay is in poor condition and in need of replacement. Facility deficiencies have been identified within this report and the existing facility remains an economic and environmental liability to the Corporation and the community. Based on input from AEA, Askinuk Corporation, NVSB, and the City of Scammon Bay, HDL recommends AEA pursue design of a new tank farm as outlined in this report.

11.0 REFERENCES

ADEC 2020a. Site Report: Scammon Bay Askinuk Corp Tank Farm. State of Alaska, Department of Environmental Conservation, Contaminated Sites Program, Accessed September 4, 2020.

ADEC 2020b. Personal communication with ADEC Solid Waste Program staff. HDL Engineering Consultants, LLC. August 28, 2020.

ADLWD 2018. Alaska Population Overview: 2018 Estimates. State of Alaska, Department of Labor and Workforce Development, Research and Analysis Section. December 2019.

Lemay 2017. 2017 Bulk Fuel Letter Report—Scammon Bay. Prepared for Alaska Energy Authority. Lemay Engineering and Consulting, Inc. August 25, 2017.

APPENDIX A

Site Selection Memorandum

HDL ENGINEERING Consultants LLC

MEMORANDUM

DATE: July 14, 2020

TO: Bill Price, P.E.

FROM: Owen Means/Mark Swenson, P.E.

RE: Site Selection Memorandum
Scammon Bay Bulk Fuel Upgrade Project

INTRODUCTION AND BACKGROUND

The Alaska Energy Authority (AEA), in cooperation with the Native Village of Scammon Bay (NVSB), the City of Scammon Bay (City), and the Askinuk Corporation (Corporation), is proposing to construct a new bulk fuel tank farm in Scammon Bay, Alaska. The new tank farm would be owned by NVSB and operated by the Corporation.

This Site Selection Memorandum presents and evaluates potential site alternatives for the new tank farm. This report describes the purpose and need for the project; design standards for the new facility; process used to identify and evaluate site alternatives; and provides a comparison of the alternatives. The purpose of this report is to inform the decision-making process so that project stakeholders can select a site alternative that meets the needs of the community.

This report provides a recommended site alternative based on concept-level engineering analyses conducted on cost effectiveness, constructability, and operability. Following selection of a final site alternative by NVSB, AEA will carry the selected alternative forward for detailed analysis in the Concept Design Report and 35% design.

Project Need and Purpose

Bulk fuel storage for retail sales of heating oil and gasoline in Scammon Bay is provided by the Askinuk Corporation-owned and operated tank farm located to the northwest of the village. The tank farm is subject to periodic flooding and ice flows during the fall, winter, and spring, and is at risk of erosion and damage to its foundation, embankment, and containment dikes. The facility has also reached the end of its useful life, as the majority of the tanks are Bureau of Indian Affairs (BIA) style vertical tanks that are over 40 years old. There are several code violations and safety risks associated with the tank farm's current condition and there is a history fuel leaks and releases outside secondary containment.

The purpose of this project is to provide a new, code-compliant retail sales tank farm in Scammon Bay that mitigates risk from flooding, ice damage, and erosion.

DESIGN CRITERIA

Fuel Storage

The existing Corporation tank farm features 17 tanks, some of which are deteriorated and not in use, and one that is currently located outside the tank farm's secondary containment. The fuel storage capacity is approximately 140,000 gallons, of which there currently is 90,000 useable gallons.

Askinuk Corporation provided fuel delivery data for the years 2015-2016 and 2018-2019 (Table 1). According to the fuel delivery data, the facility typically receives on average 121,750 gallons of fuel per year (50,000 gallons diesel and 71,750 gallons gasoline). The facility typically receives deliveries of both Diesel #1 and gasoline in the spring and the fall. Gasoline is used by all-terrain vehicles (ATVs) and small marine vessels and Diesel #1 is used for home heating. Gasoline use is reportedly greatest in the summer when ATV use and fishing are at their peak. Diesel fuel use is generally greatest between September and April.

Table 1: Existing Fuel Delivery Data

Year	Diesel #1 (gallons)	Gasoline (gallons)	Total annual (gallons)
2015	60,000	70,000	130,000
2016	40,000	90,000	130,000
2018	40,000	70,000	110,000
2019	60,000	57,000	117,000
Four-year average	**50,000**	**71,750**	**121,750**

Scammon Bay has experienced steady population growth between 1980 (pop. 250) and 2018 (pop. 598) (Alaska Department of Labor and Workforce Development [ADLWD] 2018). The ADLWD projects the total population of the Kusilvak Census Area, where Scammon Bay is located, will increase from 8,333 persons in 2018 to 11,105 in 2045, an annual growth rate of 1.07 percent (ADLWD 2018). Using the 1.07 percent annual growth rate, the projected population in Scammon Bay will increase from 598 in 2018 to 797 in 2045.

Fuel storage calculations were performed based on available fuel delivery data for 2015 through 2020, and adjusted for projected population growth in the community. The fuel storage projection uses a design year of 2045 (25 years). The projection assumes that all fuel sold is consumed by the community for the identified uses of home heating and ATV and small marine vessels, and the proportion of fuel demand for Diesel and gasoline will remain constant in the future. Other than those resulting from projected population growth, there are no new facilities or projects planned or known by the community that would add additional fuel demand. Construction projects, such as planned improvements to the Scammon Bay Airport and water/sewer infrastructure, require a significant quantity of fuel for operating equipment; however, we assume the construction contractor would be responsible for supplying their own fuel and would not rely on the local fuel supply.

Using an annual growth rate of 1.07%, the projected fuel demand in Scammon Bay will increase from the current 121,750 gallons to 160,534 gallons in 2045. The projected demand

for Diesel #1 will increase from the current 50,000 gallons to 65,928 gallons in 2045, and the projected demand for gasoline will increase from the current 71,750 gallons to 94,606 gallons in 2045. Assuming 90 percent of useable capacity per tank, the projected fuel storage required in 2045 is 73,253 gallons diesel and 105,118 gallons gasoline (178,371 gallons aggregate).

SITE VISIT

The project team (Mark Swenson, Kent Kornegay, and Owen Means of HDL and Bill Price of AEA) conducted a site visit to Scammon Bay on June 29, 2020. The purpose of the site visit was to:

- investigate potential sites for the new tank farm facility and header alignments;
- verify the condition of existing horizontal tanks in the existing Corporation tank farm and determine their suitability for re-use;
- evaluate foundation requirements;
- assess typical construction methods;
- investigate local access, labor, and heavy equipment availability;
- refine our understanding of the logistics of transporting construction materials and equipment to the community; and
- perform environmental fieldwork at sites where new ground disturbance would occur.

The team arrived in Scammon Bay via charter at approximately 11:30 am, where representatives with NVSB met the project team and provided transportation to the existing Corporation tank farm and marine header, potential tank farm sites, the community material source, the school tank farm, and tribal office.

NVSB provided local knowledge and input during the course of the investigation, including information about seasonal timing and locations of flooding and ice flows, occupancy of buildings in the community, property ownership, and additional sites that may be available for use as a tank farm that were not previously known to the project team.

The project team also met with Corporation tank farm management to discuss challenges with maintenance and operation of the existing tank farm and to identify goals and desires for the new facility. Corporation management provided information regarding the timing and volume of fuel deliveries, public fuel sales and dispensing operations, recent fuel shortages, and future work planned to address petroleum-contaminated soils at the existing Corporation tank farm.

A public open house was held outside at the tribal office building at 4:30 pm to present the project to the public. Fifteen people participated, including several members of the NVSB Tribal Council and the Corporation Board of Directors. A summary of input from the public, Corporation, and NVSB is provided in the following section.

The project team departed Scammon Bay via charter at approximately 5:30 pm.

SITE SELECTION

Prior to conducting a site visit to investigate potential tank farm sites, HDL conducted office-based research to determine basic information about property ownership, fuel usage and

barge deliveries, and current site usage. The following general criteria were used to gain an understanding of the suitability of the potential tank farm locations:

- Property ownership
- Marine header construction
- Flood elevation and erosion
- Pad construction
- Site access
- Operation and Maintenance
- Construction cost

Site Alternatives for New Tank Farm Facility

Using the constraints listed above, AEA and HDL identified three sites (Figure 1) for investigation during the site visit: Site 1, ("hill site"), Site 2 ("AVEC [Alaska Village Electric Cooperative] site"), and Site 3 ("landfill site"). Another alternative, the "sewage lagoon site", located adjacent to and northwest of the community sewage lagoon, was considered initially, but was determined to not be a practicable alternative because it would require significant fill to construct a pad and a longer marine header pipeline than Site 1 and Site 2. Therefore, the sewage lagoon site was dismissed from further consideration during the site visit.

- Site 1 – Hill Site is located west of the village and approximately 400 feet south of the existing Corporation Tank Farm. Site 1 would require repair and drainage improvements to 300 feet of existing access road, and an approximately 1,300 feet of marine header pipeline through wetlands and anadromous fish habitat.
- Site 2 – AVEC Site is located immediately adjacent to and north of the existing AVEC tank farm. Site 2 has direct access from Kun Street. The site would require an approximately 1,200-foot marine header pipeline parallel to the existing AVEC pipeline and negotiations with AVEC to acquire property for tank farm construction.
- Site 3 – Landfill Site is located on the gravel pad covering the old community landfill. During the site investigation, NVSB representatives suggested including this site as an alternative. The site would require trucking fuel from the barge to the tank farm to receive fuel.

Community Input

During meetings with the public and NVSB and Corporation representatives, the project team discussed the overall purpose, need, and scope of the project; the challenges of operating and maintaining the existing Corporation tank farm; the sites being considered for development of the new tank farm; and operation and maintenance considerations for the new tank farm. Using the basic information known to the project team about each of the sites described above, the project team asked for the community's input on a new tank farm location. The following comments were recorded. Responses from the project team are shown in italics.

Tank farm location

- Askinuk Corporation intends to donate land and gravel for construction of the new facility.
  Project team response: Land and gravel donations from the Corporation will be taken into account in the Rough Order-of-Magnitude cost estimates generated for this report.
- Prefer Site 1 because it is away from residences.
  Project team response: Thank you for your comment.
- Site 1 has wet seeps coming from the hillside.
  Project team response: The design for the new tank farm would need to account for hydrological conditions at the site.
- Site 1 has snow drifts up to 30 feet high during the winter.
  Project team response: The design for the new tank farm would need to account for snow drifting conditions at the site.
- Would Site 2 be constructed using a gravel pad or piles?
  Project team response: The tank farm foundation would be determined during the CDR phase of the project.
- At Site 1 and Site 2, the soil moves and is unstable.
  Project team response: A geotechnical evaluation will be conducted and stable foundation will be designed for the site.
- Object to Site 3 because it is a fire and explosion hazard for the nearby residences and the school.
  Project team response: The new tank farm would be sited according to setback requirements of the International Fire Code.
- Object to Site 3 because you would be able to smell fuel from the nearby residences.
  Project team response: The new tank farm will not have the severe fuel smell that the existing tank farm has.
- Site 3: Would there be a surcharge for trucking fuel that would affect fuel costs?
  Project team response: Yes, a fuel surcharge for trucking in the amount of approximately $0.25 per gallon may be added to the base fuel price.
- Site 3: Gas is mostly used in the summer. It would be a hassle for the fuel to be on the other side of town than the Corporation office. The Corporation has not consistently delivered fuel using its mobile fuel trailer.
  Project team response: The Corporation has offered to deliver fuel to boats on a more consistent basis.
- Site 3 would take up space that could be used for two or three homes.
  Project team response: The tank farm site is located above a closed landfill which is not typically used for residential home construction.
- When considering snow drifting, the school installed snow fences to mitigate drifting.
  Project team response: Thank you for your comment.
- A representative of NVSB stated they prefer Site 3.
  Project team response: Thank you for your comment.
- Several open house attendees expressed their preference for Site 3.
  Project team response: Thank you for your comment.

Other

- The community is considering to request that AVEC move their tank farm to a location near Site 1.
  Project team response: Thank you for your comment.
- A fuel spill occurred at the AVEC tank farm near Site 2 is the past.
  Project team response: Thank you for your comment.
- Will there be cost estimates for each alternative?
  Project team response: Rough Order-of-Magnitude estimates will be generated for consideration during site selection.

Project scope

- Site 1 should include a dike constructed of rock from the hill to the river to inhibit flooding and ice flows from reaching the community.
  Project team response: Construction of a dike is not in the scope of the project.
- What size tanks will be installed?
  Project team response: Horizontal tanks are usually 27,000 or 30,000 gallons. Vertical tanks range in size up to 50,000 gallons.

SITE EVALUATION AND COMPARISON

The following section presents an evaluation of each site against the site selection criteria described above, and after consideration of community input provided to the project team during the site visit and public open house. It is important to note that this a general overview of the evaluation criteria as it applies to each site. This is not a completed conceptual design report, and additional research of the selected site will be required prior to design.

Site 1 – Hill Site

1. Property ownership: The gravel pad, access road, and marine header pipeline would all be located on Corporation property. Property would need to be conveyed to NVSB to establish site control.
2. Marine header construction: Fuel delivery would be through an approximately 1,300-foot pipeline that crosses a fish stream. The stream crossing would require a new large-diameter culvert and provisions to protect the culvert and pipeline from ice, flooding, and erosion. A permit from the Alaska Department of Fish and Game and a detailed hydrology and hydraulics study would need to be performed to determine appropriate design and construction measures to ensure fish passage and mitigate erosion concerns.
3. Flood elevation and erosion: The gravel pad would be located above historical flood elevations. The access road would be constructed within a low-lying area that is inundated with water and may be subject to damage from flooding and ice.
4. Pad construction: The gravel pad would be constructed at the base of the hill. The area is known to contain seeps, but is at a higher elevation than the adjacent marsh. An estimated 9,200 cubic yards of fill would be required to construct a stable, 5-foot-thick pad for the tank farm. The pad would need to be constructed with extra room to

allow equipment to remove drifting snow. Fill material of sufficient volume and quality is assumed to be available locally at the Corporation-owned material site.

5. Site access: Site 1 would require an access road connecting the facility to Fuel Farm Road and would require easements. An estimated 450 cubic yards of fill would be required to construct a stable base for the access road.
6. Operation and Maintenance: Site 1 is located in an area known to accumulate large snow drifts. Severe drifting would affect the operation of the tank farm. Severe drifting was experienced in a similar hillside cut for the school tank farm and the school elected to relocate their tank farm to mitigate the drifting. Snow would need to be removed more frequently for safe operation of the facility.
7. Construction cost (w/ 25% contingency): $6,521,000
8. Fuel cost considerations: Future fuel costs would be similar to future fuel costs at the existing tank farm.

Site 2 – AVEC Site

1. Property ownership: The gravel pad and header pipeline would be located property owned by AVEC, and would require subdividing and acquiring the unused portion of the lot from AVEC.
2. Marine header construction: Fuel delivery would be through a 1,300-foot header pipeline that follows the AVEC pipeline alignment and header location.
3. Flood elevation and erosion: Site 2 is located on marshy ground that is known to be inundated with water during flood surges; however, the site is not expected to experience damage or significant erosion from ice flows.
4. Pad construction: An estimated 16,400 cubic yards of fill would be required to construct a stable, 8-foot-thick pad for the tank farm under Option A – Gravel Pad.
5. Site access: Site 2 would be accessed directly from Kun Street.
6. Operation and Maintenance: Operation and maintenance at Site 2 would likely be the easiest of the three alternatives, and would be similar to the existing tank farm.
7. Construction cost (w/ 25% contingency):
   Option A – Gravel Pad: $5,692,300
   Option B – Steel containment: $8,915,000
8. Fuel cost considerations: Future fuel costs would be similar to future fuel costs at the existing tank farm.

Site 3 – Landfill Site

1. Property ownership: The gravel pad would be located on a combination of Corporation-owned and City-owned land. City-owned land includes an easement on the northern portion of the old landfill site. The site would require acquisition of the land currently held in easement by the City and conveyance of the remainder of the tank farm site from the Corporation to NVSB. Site 3 would require coordination with the Alaska Department of Environmental Conservation (ADEC), Division of Solid Waste to ensure that no waste is excavated during construction at the old landfill site.
2. Marine header construction: Site 3 would require an approximately 3,900-foot pipeline to utilize a marine header for fuel deliveries. Due to land availability, the pipeline would need to run through the village along community roads. Pipeline

installation would cause severe impacts to the community during construction. Significant relocations of other utilities would be required. The pipeline would contain fuel year-round. The cost of a marine header and pipeline for Site 3 would be an additional $1,095,000. For these reasons, Site 3 includes deliveries made using fuel trucks. Insurance premiums for the facility may be renegotiated based on the change in fuel delivery method.

3. Flood elevation and erosion: Site 3 is located on high ground above flood elevations.
4. Pad construction: Site 3 is located on an existing gravel pad on top of the old community landfill. An estimated 5,700 cubic yards of fill would be required to construct a stable, 1-foot-thick pad for the tank farm.
5. Site access: Site 3 would be accessed directly from Front Street via the existing gravel driveway.
6. Operation and Maintenance: Operation and maintenance of the facility would be similar to existing. However, fuel sales would require a fueling operator to be present at the facility for dispensing.
7. Construction cost (w/ 25% contingency): $3,889,800
8. Fuel cost considerations: An approximately $0.25 per gallon surcharge for trucking can be expected to be added to the base price charged by fuel providers.

Cost Comparison

Approximate costs for large-dollar items for each site are presented below. Total construction costs include 25 percent contingency.

Site 1 – Hill Site

- Land acquisition: $0
- Site work: $2,741,800
- Site access construction: $195,000
- Tanks and piping: $1,010,000
- Truck fill station: $0
- Marine header construction: $470,000
- Dispenser: $100,000
- Sales building: $50,000
- Labor and equipment: $650,000
- **Total construction cost: $6,521,000**

Site 2 – AVEC Site

Option A – Gravel pad:

- Land acquisition: $150,000
- Site work: $2,371,800
- Site access construction: $0
- Tanks and piping: $1,010,000
- Truck fill station: $0
- Marine header construction: $472,000
- Dispenser: $100,000
- Sales building: $50,000

- Labor and equipment: $550,000
- **Total construction cost: $5,692,300**

Option B – Pile supported steel:

- Land acquisition: $150,000
- Steel containment construction: . $4,000,000
- Site work: $440,000
- Site access construction: $0
- Tanks and piping: $1,070,000
- Truck fill station: $0
- Marine header construction: $472,000
- Dispenser: $100,000
- Sales building: $50,000
- Labor and equipment: $1,000,000
- **Total construction cost: $8,915,000**

Site 3 – Landfill Site

- Land acquisition: $0
- Site Work: $1,301,800
- Site access construction: $0
- Tanks and piping: $1,010,000
- Truck fill station: $150,000
- Marine header construction: $0
- Dispenser: $100,000
- Sales building: $50,000
- Labor and equipment: $500,000
- **Total construction cost: $3,889,800**

Decision Matrix

The decision matrix shown below provides a "ranking" of each the evaluation criteria applied to each site (Table 2). The optimal site for a given criteria was given a ranking of "3" and the least optimal was given a ranking of "1."

Table 2: Ranking of Tank Farm Sites

Evaluation Criteria	Site 1 – Hill Site	Site 2 – AVEC Site	Site 3 – Landfill Site
1. Property ownership	3	1	3
2. Marine header	1	3	2
3. Flood elevation & erosion	2	1	3
4. Pad construction	2	1	3
5. Site access	1	2	3
6. Operation & maintenance	1	3	2
7. Construction cost	1	2	3
8. Fuel cost considerations	3	3	1
Total Score:	**13**	**15**	**20**

Recommended Site for Development

Based on the evaluation criteria discussed in this memo, the recommended site for construction of the new tank farm facility is Site 3 – Landfill Site. The cost of installing the facility at this site is expected to be significantly less than Sites 1 and 2, allowing construction to occur sooner than alternative sites. Additionally, this site has reduced risk of damage from flooding, floating ice, and erosion; will require less earthwork; and is not expected to experience large snow drifting. The site will require coordination with the ADEC for construction of a tank farm at the site to ensure that no waste is excavated during construction.

We understand the retail price of fuel is a high priority for the community. If retail fuel price is the community's first priority for site selection, then the recommended site for the facility is Site 2 – AVEC Site, Option A – Gravel Pad. Site 2 would allow for fuel deliveries to continue via barge header. However, construction may be delayed significantly due to funding challenges associated with the higher construction cost and the need for fill material to settle for one or more years during pad construction. In addition, the community would need to work with AVEC to re-acquire a portion of AVEC's lot for site control.

attachments: Figure 1: Tank Farm Site Alternatives

APPENDIX B

Community Resolutions and Meetings

Askinuk Corporation
P.O. Box 89 • Scammon Bay, Alaska 99662 • Phone: 907-558-5411 • Fax: 907-558-5412 • E-mail: askinukcorp@yahoo.com

August 4, 2020

Special Meeting

Call to order by Chairman, Harley Sundown at 10:05am

Roll Call: Harley Sundown, Homer Hunter, Tim Kaganak, Randall Charlie present, Byron Ulak will join later, has previous commitment. Also, in attendance, Office Manager, James Kaganak.

Invocation: Tim Kaganak

Business: Location of new tank farm. Three possible sites to construct tank farm, Site # 1, Hill Site, Site #2, AVEC Site, and Site #3, Landfill Site. Review of letter from HDL Engineering of their findings of each site. Lively discussion on each site. All board members voiced their opinion of advantages, cost and disadvantages, accessibility, flood potential and settlement of gravel in each site. After discussion, Homer Hunter makes a motion to select Site # 3, the Landfill Site, second by Tim Kaganak, all in favor, motion passes. Roll Call: Harley Sundown, Homer Hunter, Tim Kaganak and Randall Charlie vote yes, Byron Ulak cast his yes vote by text and will confirm in the Regular Meeting.

Land Request: The Scammon Bay Traditional Council's request for land to place a couple of modular buildings next to the Corporation Office. The Board discussed the area and want to use this area for future growth of the Corporation. Request is denied but asks SBTC to look for alternative site. The board unanimously appoints James Kaganak to work with Brandon Aguchak and report back to the Board for the selection.

Comments: Homer Hunter comments about the unfinished business of 14c lands and would like it discussed in the next regular board meeting. No other comments.

Adjournment: Tim Kaganak makes a motion to adjourn, second by Randall Charlie, all in favor, motion passes.

Adjourned at 10:39 am.

Scammon Bay Traditional Council
103 Askinuk Street/P.O. Box 110 Scammon Bay, AK 99662-0110
Phone (907) 558-5425 Fax (907) 558-5134 E-mail admin@marayarmiut.com

RESOLUTION 20-08-11-3

Native Village of Scammon Bay Bulk Fuel Facility
Land Agreement and Official Acceptance

Pursuant to the Native Village of Scammon Bay Resolution # 20-08-11-3 the Native Village of Scammon Bay Bulk Fuel Facility serves the well-being of Native Village of Scammon Bay tribal members, residents and visitors.

Whereas, This bulk fuel facility project is an urgent need in the tribal community of Native Village of Scammon Bay.

Whereas, The Native Village of Scammon Bay, Alaska agrees to receive tribal ownership of the bulk fuel facility.

Whereas, The Askinuk Corporation and The Native Village of Scammon Bay (NVSB) have agreed in the ownership of the bulk fuel facility and are processing the official transfer of ownership from the Askinuk Corporation to the Native Village of Scammon Bay.

Now therefore be it resolved that, The location is known as the 'old city dump location'. (SITE SELECTION #3) Additional location description to be included in the transfer official paperwork for the bulk fuel facility.

CERTIFICATION

This certifies that the Council is composed of five (7) duly elected members of the Native Village of Scammon Bay whom 5 were present at a meeting this 11th day of August, 2020 and the Council adopted this resolution by a vote of 5 in favor, and 0 in opposition, ___ abstaining.

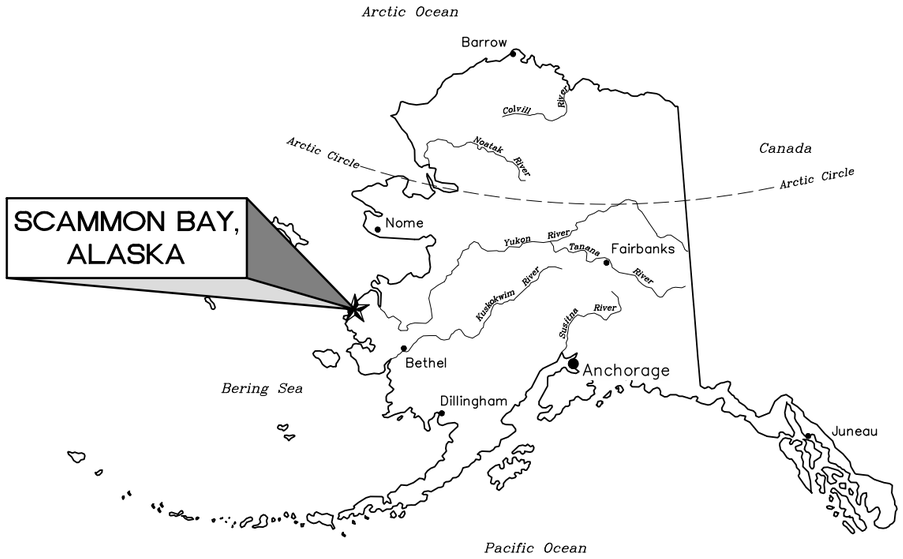
NATIVE VILLAGE OF SCAMMON BAY COUNCIL
Attest:

Anthony Ulak, President

John Uttereyuk, Secretary/Treasurer

APPENDIX C

Conceptual Design Drawings



LOCATION MAP

VICINITY MAP

SCAMMON BAY BULK FUEL UPGRADES
SCAMMON BAY, ALASKA
35% DRAWINGS

DRAWING INDEX	
Sheet Number	Sheet Title
G1.01	COVER SHEET AND DRAWING INDEX
G1.02	GENERAL NOTES, LEGEN, AND ABBREVIATIONS
G1.03	PROJECT LAYOUT PLAN
C1.01	SITE PLAN EARTHEN DIKE CONTAINMENT
C1.02	TANK FARM SITE PLAN WOOD DIKE CONTAINMENT
C2.01	TANK FARM PIPING PLAN
C2.02	TRUCK TRANSFER PIPING PLAN
C2.03	DISPENSER STATION PIPING PLAN AND DETAILS
C3.01	SECTIONS TANK FARM
C3.02	SECTION TANK FARM
C3.03	SECTIONS TANK FARM
C4.01	RETAIL SALES BUILDING FLOOR PLAN
C4.02	RETAIL SALES BUILDING DETAILS
C4.03	DISPENSER ENCLOSURE FRAMING PLAN AND ELEVATIONS
C4.04	DISPENSER ENCLOSURE SECTIONS AND DETAILS
C4.05	TANK FARM PUMP BOX DETAILS
C5.01	27,000 GALLON SINGLE WALL BULK TANK
C5.02	12,000 GALLON SINGLE WALL DUAL PRODUCT DISPENSING TANK

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ANCHORAGE
907.564.2120
MAT-SU
907.746.5230
3335 Arctic Boulevard, Suite 100 Anchorage, AK 99503
www.HDLalaska.com
AECL861

ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES

SCAMMON BAY, ALASKA

SHEET TITLE
COVER SHEET AND DRAWING INDEX

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GENERAL

1. TOPOGRAPHIC AND PLANIMETRIC INFORMATION SHOWN IN THESE DRAWINGS WAS PROVIDED BY A FIELD SURVEY PERFORMED BY HDL ENGINEERING CONSULTANTS, LLC (HDL), _____, 2020.

2. CONTRACTOR SHALL VERIFY SITE CONDITIONS, DIMENSIONS, AND DETAILS PRIOR TO THE START OF CONSTRUCTION. IF ANY DISCREPANCIES AND/OR UNKNOWN CONDITIONS WHICH AFFECT THE PROJECT ARE FOUND, THE CONTRACTOR SHALL NOTIFY THE ENGINEER. THE CONTRACTOR WILL BE REQUIRED TO PROVIDE MINOR LAYOUT CHANGES IN THE FIELD, SUBJECT TO APPROVAL BY THE ENGINEER.

3. NOT ALL UTILITIES MAY BE SHOWN ON THE PLANS. CONTRACTOR SHALL FIELD VERIFY EXISTING UTILITIES BEFORE CONSTRUCTION. CONTRACTOR SHALL PROTECT UTILITIES AT ALL TIMES DURING CONSTRUCTION, AND REPAIR DAMAGES IN ACCORDANCE WITH THE RESPECTIVE UTILITY COMPANIES REQUIREMENTS.

4. CONTRACTOR SHALL PROVIDE AND MAINTAIN ALL SIGNS, BARRICADES, WARNING LIGHTS, AND OTHER PROTECTIVE DEVICES NECESSARY FOR SAFETY.

5. CONTRACTOR SHALL COMPLY WITH THE REQUIREMENTS OF THE INTERNATIONAL BUILDING CODE (IBC), INTERNATIONAL FIRE CODE (IFC), STATE AND FEDERAL OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATIONS (OSHA), US ENVIRONMENTAL PROTECTION AGENCY, ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION AND ALL OTHER STATE, FEDERAL, AND LOCAL LAWS AND REGULATIONS PERTAINING TO THIS PROJECT. ANY WORK PERFORMED BY THE CONTRACTOR CONTRARY TO SUCH LAWS OR REGULATIONS SHALL BE AT THE CONTRACTORS SOLE RISK AND EXPENSE.

6. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WORK WITH OTHER CONTRACTORS, HIS SUBCONTRACTORS, THE OWNER, AND STATE AND FEDERAL AUTHORITIES.

7. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL REQUIRED PERMITS NOT PROVIDED BY THE OWNER INCLUDING BUT NOT LIMITED TO ROW PERMITS, DEWATERING PERMITS, LANDFILL PERMITS, AND ADEC PERMITS.

8. ALL ITEMS SHOWN ARE NEW UNLESS SPECIFICALLY INDICATED AS EXISTING. INSTALL ALL MATERIAL AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS, AND INSTALLATION DRAWINGS UNLESS INDICATED OTHERWISE.

9. WORK SHALL BE PERFORMED WITH SKILLED CRAFTSMEN SPECIALIZING IN THE REQUIRED WORK. INSTALL ALL MATERIALS IN A NEAT, ORDERLY, AND SECURE FASHION, AS REQUIRED BY THESE DRAWINGS AND COMMONLY RECOGNIZED STANDARDS OF GOOD WORKMANSHIP.

10. THE PURPOSE OF SPECIFYING A NAME BRAND PRODUCT, OR EQUAL, IS TO ESTABLISH THE LEVEL OF QUALITY OF MATERIALS AND EQUIPMENT REQUIRED AND IS NOT A PRODUCT ENDORSEMENT. SUBMIT SUBSTITUTIONS IN WRITING FOR REVIEW AND APPROVAL.

11. PROVIDE MARKED UP DESIGN DRAWINGS TO REFLECT FIELD CHANGES THROUGHOUT CONSTRUCTION. TURN OVER "RED LINE" CONSTRUCTION DRAWINGS TO ENGINEER AT COMPLETION OF THE PROJECT.

12. CONTRACTOR SHALL PROTECT ALL ITEMS NOT SCHEDULED FOR DEMOLITION DURING CONSTRUCTION. DISTURBED AREAS SHALL BE RESTORED TO PRE-CONSTRUCTION CONDITION.

13. DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY SHOW ALL FEATURES OF THE REQUIRED WORK, PROVIDE ALL LABOR, EQUIPMENT AND MATERIALS REQUIRED FOR A COMPLETE, AND CODE COMPLIANT SYSTEM. VERIFY EXISTING FIELD CONDITIONS PRIOR TO STARTING CONSTRUCTION. IMMEDIATELY CONTACT THE ENGINEER FOR CLARIFICATION OF QUESTIONABLE ITEMS OR APPARENT CONFLICTS.

14. ALL CONSTRUCTION SURVEYING AND LAYOUT SHALL BE PROVIDED BY THE CONTRACTOR UNLESS NOTED OTHERWISE.

15. CONTRACTOR IS RESPONSIBLE FOR ESTABLISHING AND MAINTAINING AN APPROVED PROJECT SPECIFIC STORM WATER POLLUTION PREVENTION PLAN (SWPPP) IN ACCORDANCE WITH STATE AND FEDERAL REGULATIONS.

16. IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, THE CONTRACTOR SHALL HAVE SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THE PROJECT, INCLUDING SAFETY OF ALL PERSONS, SUBCONTRACTORS, SUPPLIERS, AND PROPERTY. THIS SHALL PERTAIN TO MATERIALS STAGED WHERE THE CONTRACTORS IS NOT ACTIVELY WORKING, STAGING AREAS, AND HAUL ROUTES. THIS SHALL INCLUDE CLEARING SNOW DRIFTS AND MAINTAINING ACCESS TO EXISTING EQUIPMENT AND FACILITIES AT ALL TIMES. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND IS NOT LIMITED TO NORMAL WORKING HOURS.

17. CONTRACTORS WORKS SHALL NOT IMPACT OR RESTRICT VEHICLE MOVEMENT ON TRAVELED WAYS OUTSIDE OF THE PROJECT AREA.

18. NO GROUND DISTURBING ACTIVITIES SHALL OCCUR BEYOND THE LIMITS OF THE EASEMENTS, EXCEPT NOTED OTHERWISE.

19. CONTRACTOR SHALL PREPARE AND IMPLEMENT AN APPROVED TRAFFIC CONTROL PLAN (TCP) SPECIFIC TO THEIR HAUL ROUTES AND SITE ACCESS. TCP SHALL NOT PREVENT OR HINDER THE FLOW OF VEHICLE OR PEDESTRIAN TRAFFIC IN THE COMMUNITY AND PROVIDE UNFETTER MOVEMENT BY EMERGENCY VEHICLES AT ALL TIMES. THE TCP SHALL CONFORM TO THE STANDARDS IN THE LATEST EDITION OF PART VI OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (MUTCD), AND SHALL ALSO CONFORM TO THE REQUIREMENTS IN THE LATEST EDITION AND SUPPLEMENTS OF THE ALASKA TRAFFIC MANUAL (ATM) PREPARED BY THE ALASKA DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES.

20. INSTALL ALL MATERIALS AND EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS, INSTALLATION MANUALS AND DRAWINGS.

21. NO BARGE LANDING AREAS, HAUL ROUTES, MATERIAL SOURCES, OR STOCKPILE AND STAGING AREAS ARE PROVIDED BY THE OWNER OUTSIDE OF THE PROJECT FOOTPRINT. THESE AREAS AND MATERIALS ARE TO BE CONTRACTOR-PROVIDED. CONTRACTORS SHALL MAKE THEIR OWN ARRANGEMENTS FOR BARGING, HAULING, MATERIAL PROCUREMENT, AND STOCKPILE AND STAGING AREAS SPECIFIC TO THEIR OWN MEANS AND METHODS AND OBTAIN ALL REQUIRED PERMITS, AUTHORIZATIONS, AND APPROVALS FOR THE USE OF THESE ROUTES AND AREAS AT NO ADDITIONAL COST TO THE OWNER. PAY ALL ROYALTIES FOR MATERIALS AND PROVIDE THE OWNER WITH A COPY OF ALL PERMITS, AGREEMENTS, AND APPROVALS. THE CONTRACTOR SHALL VERIFY THE CONDITION OF LOCAL ROADS AND TRADITIONAL BARGE LANDINGS PRIOR TO USE DETERMINE THEIR SUITABILITY TO MEET THEIR NEEDS. CONTRACTOR SHALL TAILOR THEIR OPERATIONS AND EQUIPMENT AS NEEDED TO DELIVER THE SPECIFIED MATERIAL TO THE PROJECT SITE.

22. CONTRACTOR IS RESPONSIBLE FOR MAINTAINING ALL BARGE LANDING AND HAUL ROUTES AND RETURNING THESE AREAS TO THEIR PRE-PROJECT CONDITION AFTER USE.

23. CONTRACTOR SHALL PLACE COARSE GRAVEL FILL WITHIN THE TEMPORARY CONSTRUCTION EASEMENTS AS SHOWN IN THE PLANS. CONTRACTOR SHALL LIMIT GROUND DISTURBANCE ACTIVITIES WITHIN THE TEMPORARY CONSTRUCTION EASEMENTS TO ONLY ACTIVITIES REQUIRED TO PLACE COARSE GRAVEL FILL.

LEGEND

- EXISTING PROPERTY LINE
- EXISTING EASEMENT
- ROAD/TRAIL CENTERLINE
- EXISTING EDGE OF ROAD
- EXISTING CONTOUR
- *NEW FILL*
- EXISTING CHAINLINK FENCE
- NEW CHAINLINK FENCE
- VERTICAL PIPE TRANSITION
- EXISTING BURIED BARGE OFF-LOADING PIPELINE
- NEW BURIED BARGE OFF-LOADING PIPELINE
- EXISTING UNDERGROUND ELECTRIC
- EXISTING UNDERGROUND TELEPHONE
- EXISTING SANITARY SEWER
- NEW UTILITY MARKER
- UNDISTURBED GROUND
- COMPACTED GRAVEL FILL
- FLAG NOTES PER SHEET
- DETAIL CALLOUT
- SECTION CUT
- SIGN CALLOUT

ABBREVIATIONS

AAC	ALASKA ADMINISTRATIVE CODE
ACI	AMERICAN CONCRETE INSTITUTE
ADEC	ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
APS	FIBER EXPANSION JOINT MANUFACTURER
ASME	AMERICAN SOCIETY MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING & MATERIALS
AWPA	AMERICAN WOOD PROTECTION ASSOCIATION
ALUM	ALUMINUM
CMP	CORRUGATED METAL PIPE
CP	CATHODIC PROTECTION
CU	COPPER
ELEV	ELEVATION'
E.W.	EACH WAY
EXIST	EXISTING
FG	FINISHED GROUND
FPT	FEMALE PIPE THREAD
GA	GAUGE
GALV	GALVANIZED
HDPE	HIGH DENSITY POLYETHYLENE
IBC	INTERNATIONAL BUILDING CODE
IFC	INTERNATIONAL FIRE CODE
L	LENGTH
MAX	MAXIMUM
MIN	MINIMUM
MPT	MALE PIPE THREAD
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
OC	ON CENTER
OD	OUTSIDE DIAMETER
OSHA	OCCUPATIONAL SAFETY AND HAZARD ADMINISTRATIONS
PRV	PRESSURE RELEASE VALVE
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GAUGE
ROW	RIGHT OF WAY
SCH	SCHEDULE
STA	STATION
SWPPP	STORM WATER POLLUTION PREVENTION PLAN
TCE	TEMPORARY CONSTRUCTION EASEMENT
TCP	TRAFFIC CONTROL PLAN
TP	TEST PIT
TYP	TYPICAL
UE	UNDERGROUND ELECTRIC
USS	UNIT OF STUDY SURVEY
UT	UNDERGROUND TELEPHONE
ø	DIAMETER
&	AND

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ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES

ALASKA ENERGY AUTHORITY

SCAMMON BAY, ALASKA

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PROJECT LAYOUT PLAN

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MAT-SU 907.746.5230
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ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES
ALASKA ENERGY AUTHORITY
SCAMMON BAY, ALASKA

SHEET TITLE: PROJECT LAYOUT PLAN

SHEET: G1.03

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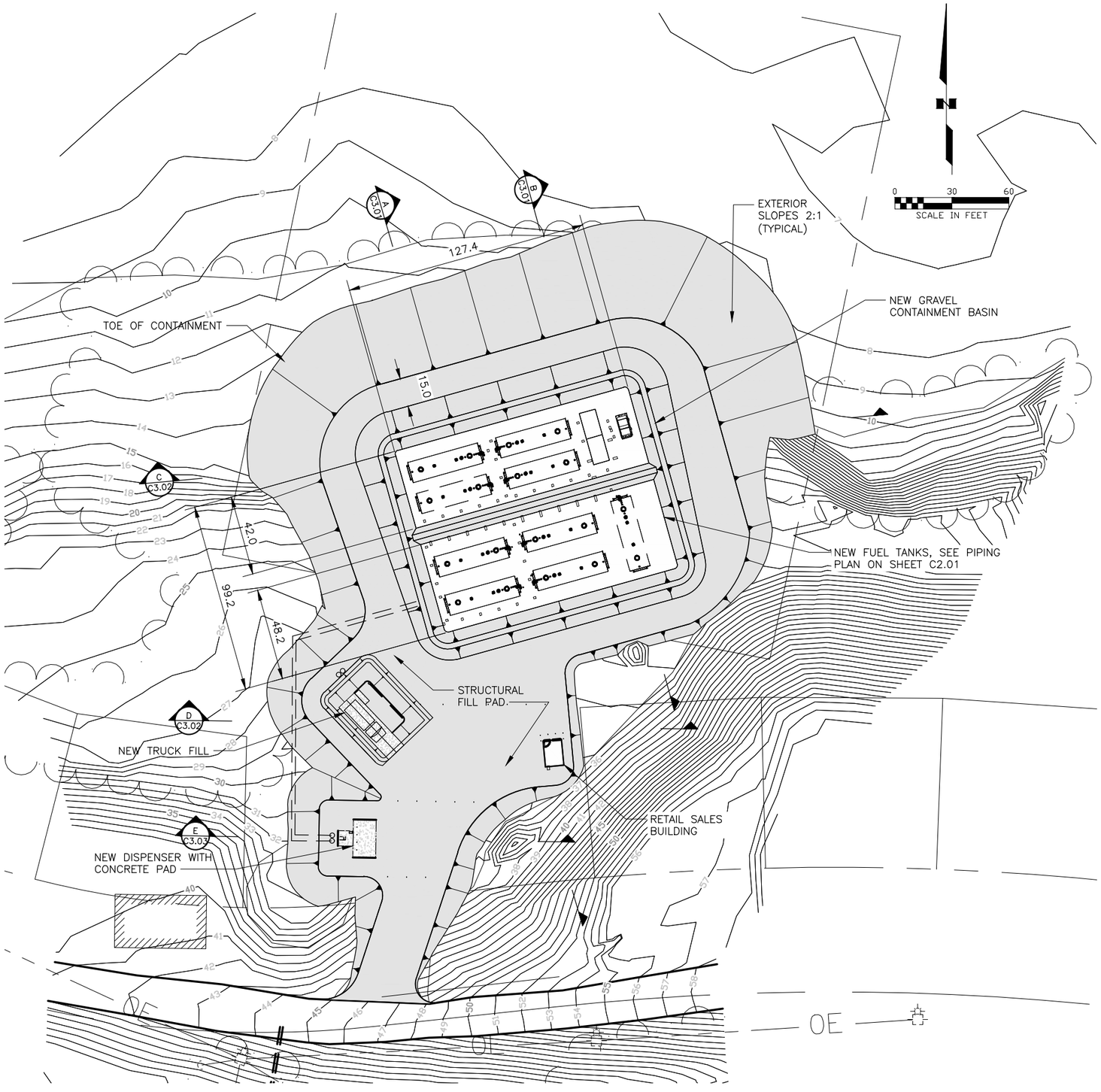
DATE: 09/30/20	SCALE: 1" =100'
JOB NUMBER: 20-017	



1 C1.01 **SITE PLAN - EARTHEN DIKE CONTAINMENT**

SCALE: 1" = 30.0'

REVISIONS		
MARK	DATE	DESCRIPTION

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907.746.5230
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ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES

SCAMMON BAY, ALASKA

SHEET TITLE
SITE PLAN EARTHEN DIKE CONTAINMENT

SHEET
C1.01

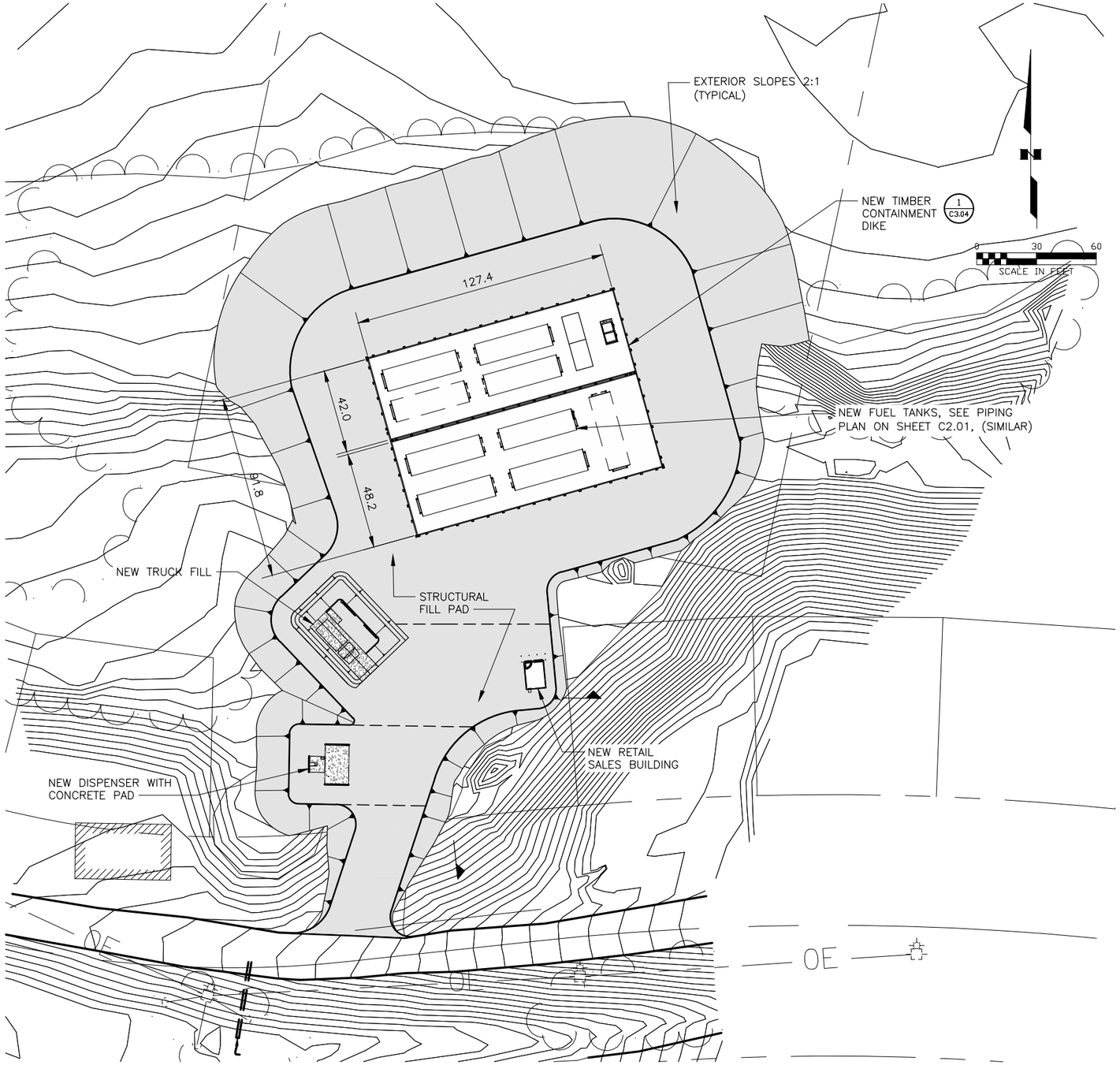
DRAWN BY:	CHECKED BY:
KK	MRS
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER: 20-017

LAYOUT C1.01

DATE TIME 10/29/2020 8:19 PM

DRAWING LOCATION H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\20-017_00_SP-DIRT-LAYOUT.dwg KKORNEGAY



1 C1.02 **SITE PLAN - TIMBER CONTAINMENT DIKE**
SCALE: 1" = 30.0'

LAYOUT
C1.02

DATE TIME
10/29/2020 8:16 PM

DRAWING LOCATION
H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\20-017_00_SP-WOOD-LAYOUT.dwg KKORNEGAY

ONE INCH

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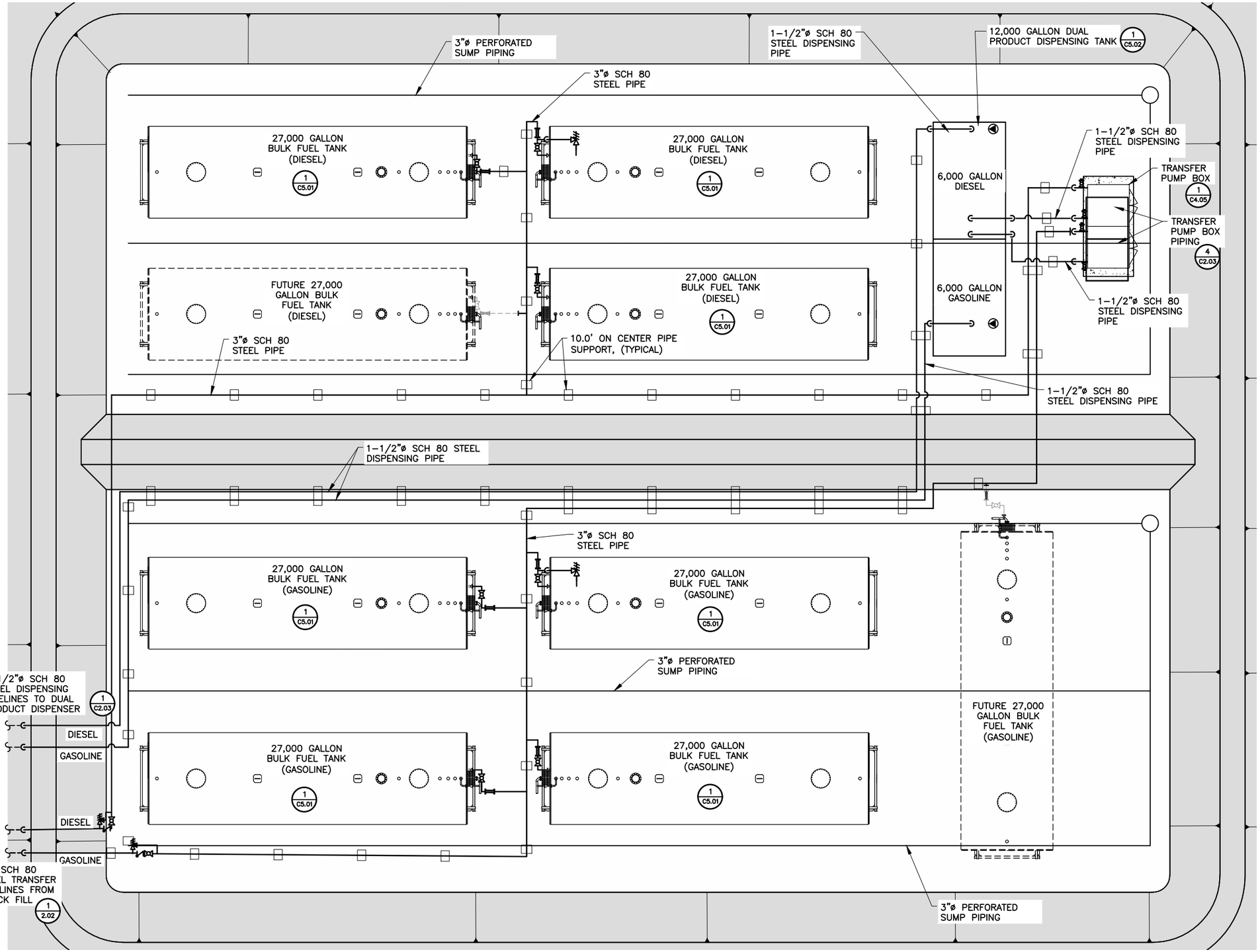
SHEET TITLE
SITE PLAN
WOOD DIKE
CONTAINMENT

SHEET
C1.02

DRAWN BY:	CHECKED BY:
KK	MRS
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER:
20-017



NOTES:

1. SEE SHEET G1.02 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. SEE PROJECT LAYOUT PLAN SHEET G1.04 FOR TANK FARM LOCATION AND PIPELINE ROUTING.
3. SEE SHEET _____ FOR TANK, PUMP AND VALVE SCHEDULES.
4. SEE SHEETS C1.04 AND C1.05 FOR CONTAINMENT DETAILS.
5. PIPING SHALL BE ROUTED AS SHOWN ON THIS PLAN. ANY CHANGES TO PIPING SHALL BE APPROVED BY THE ENGINEER PRIOR TO WORK BEING PERFORMED. PIPE PENETRATIONS ARE NOT PERMITTED THROUGH THE CONTAINMENT.
6. PROVIDE PRODUCT IDENTIFICATION LABELS AND TANK NUMBERS ON ALL TANKS. PROVIDE KEYED-ALIKE PAD LOCKS ON ALL DOORS AND FENCE GATES.
7. SEE SHEET C5.00 – C5.02 FOR SIGN AND PLACARD LEGEND.
8. PROVIDE PIPE SUPPORTS MINIMUM 10' SPACING.
9. SEE FIRE EXTINGUISHERS LOCATED ON SITE PLAN SHEETS C1.02, AND C1.03.
10. ALL WORK SHOWN ASSUMED AS SCHEDULE A, UNLESS OTHERWISE NOTED.

LEGEND

- FLANGED BALL VALVE
- FLANGED CHECK VALVE
- ACTUATED BALL VALVE
- PRESSURE TEST BALL VALVE
- FLANGED FLEX FITTING
- VERTICAL TRANSITION (UP OR DOWN)
- PIPE TEE (DOWN)
- CENTRIFUGAL PUMP
- REDUCER
- FIRE EXTINGUISHER
- PRESSURE GAUGE
- FILTER
- PRESSURE RELIEF VALVE
- SIGNAGE PLACARD SEE SHEETS C5.00 – C5.02
- VALVE TAG NUMBERS

0 6 12
SCALE IN FEET

1 C2.01 **TANK FARM - PIPING PLAN**
SCALE: 1" = 6.0'

REVISIONS

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SCAMMON BAY BULK FUEL UPGRADES

SCAMMON BAY, ALASKA

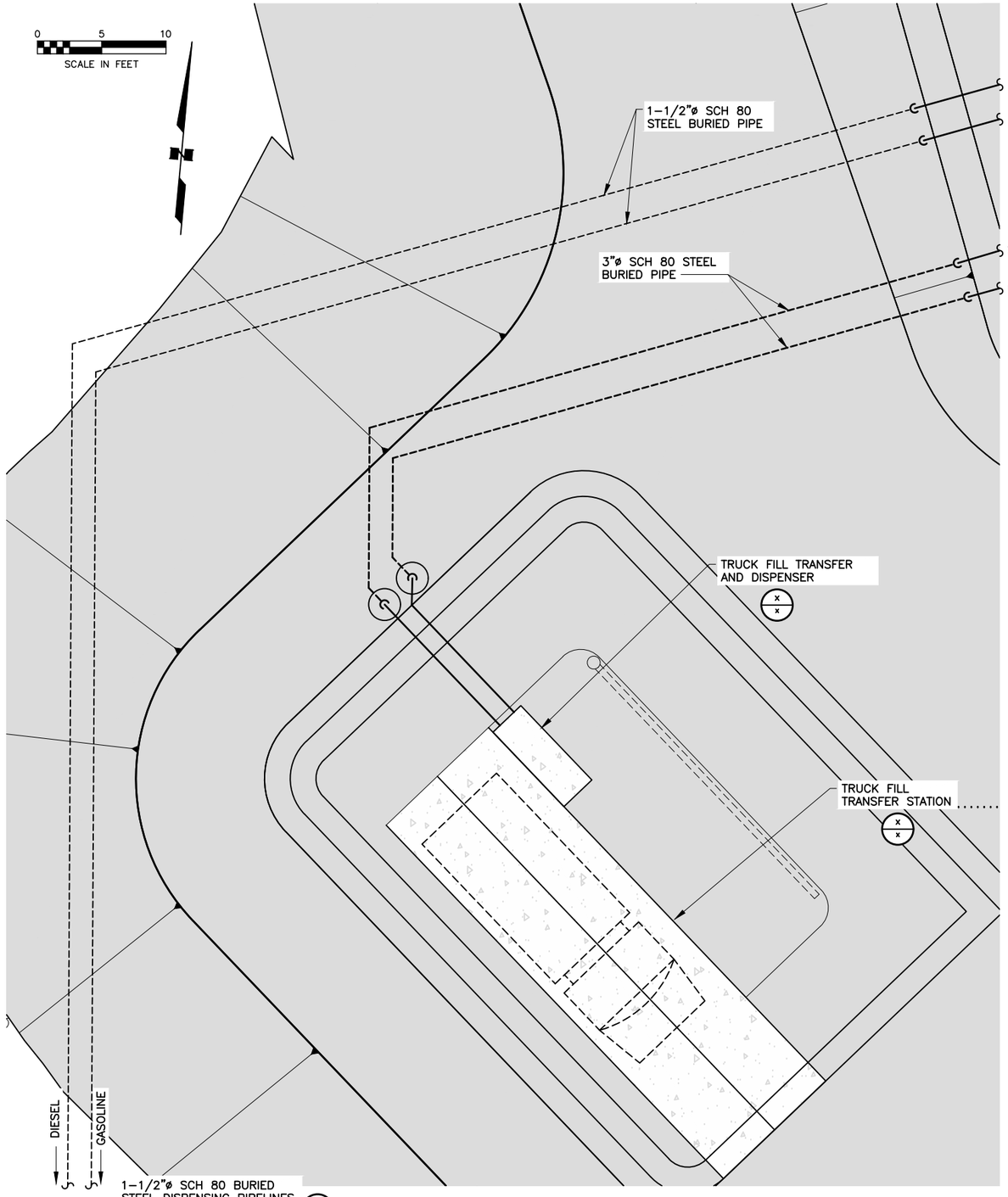
SHEET TITLE: TANK FARM PIPING PLAN

SHEET: C2.01

DRAWN BY:	CHECKED BY:
KK	MRS
DATE: 09/30/20	SCALE: AS SHOWN

JOB NUMBER: 20-017

LAYOUT TF-PIPING
DATE TIME 10/29/2020 7:39 PM
DRAWING LOCATION H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\20-017_00_TF-PIPING.dwg KKORNEGAY



1 C2.02 **TRUCK TRANSFER AND DISPENSING - PIPING PLAN**
SCALE: 1" = 5.0'

NOTES:

1. SEE SHEET G1.02 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. SEE PROJECT LAYOUT PLAN SHEET G1.03 FOR TANK FARM LOCATION AND PIPELINE ROUTING.

REVISIONS

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SCAMMON BAY, ALASKA

SHEET TITLE
TRUCK TRANSFER PIPING PLAN

SHEET
C2.02

DRAWN BY:	CHECKED BY:
KK	MRS
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER: 20-017

LAYOUT
TRUCK-PIPING

DATE TIME
10/29/2020 1:53 PM

DRAWING LOCATION
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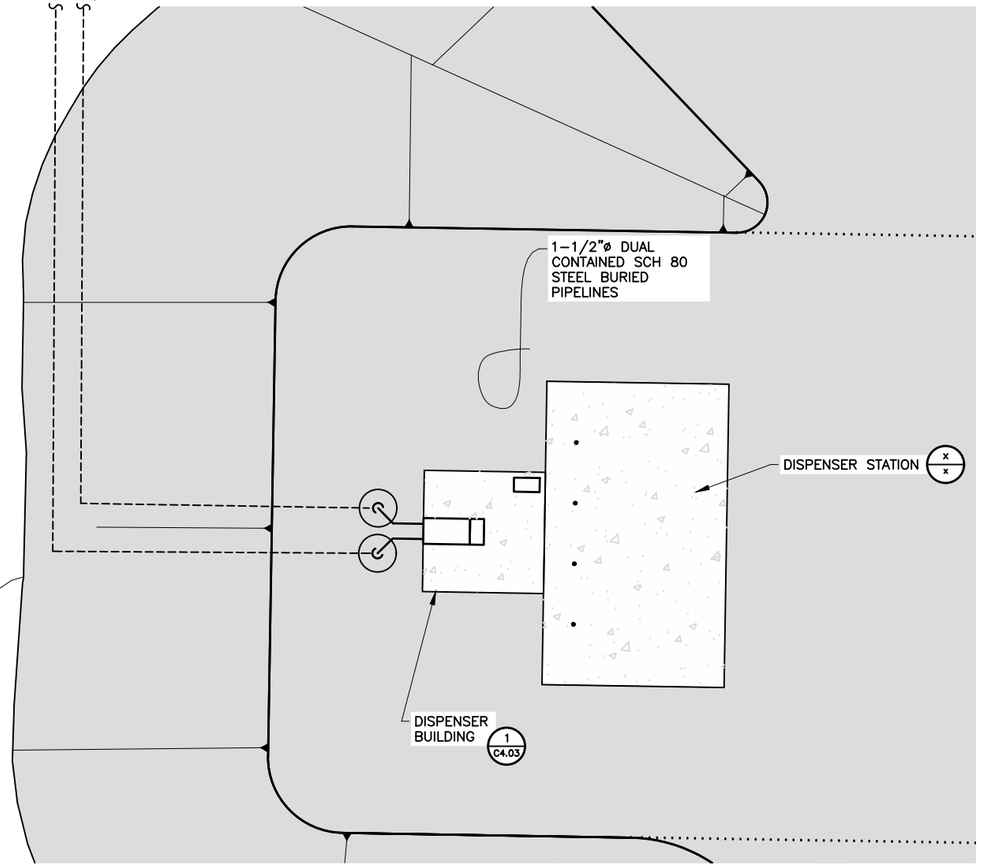


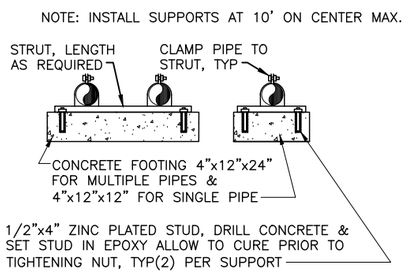
0 5 10
SCALE IN FEET

NOTES:

1. SEE SHEET G1.02 FOR GENERAL NOTES, ABBREVIATIONS, AND LEGEND.
2. SEE PROJECT LAYOUT PLAN SHEET G1.03 FOR TANK FARM LOCATION AND PIPELINE ROUTING.

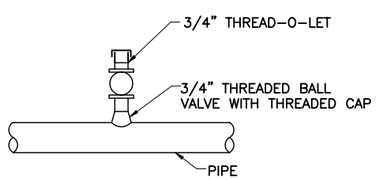
1 C2.03 DISPENSING STATION - PIPING PLAN

SCALE: 1" = 5.0'



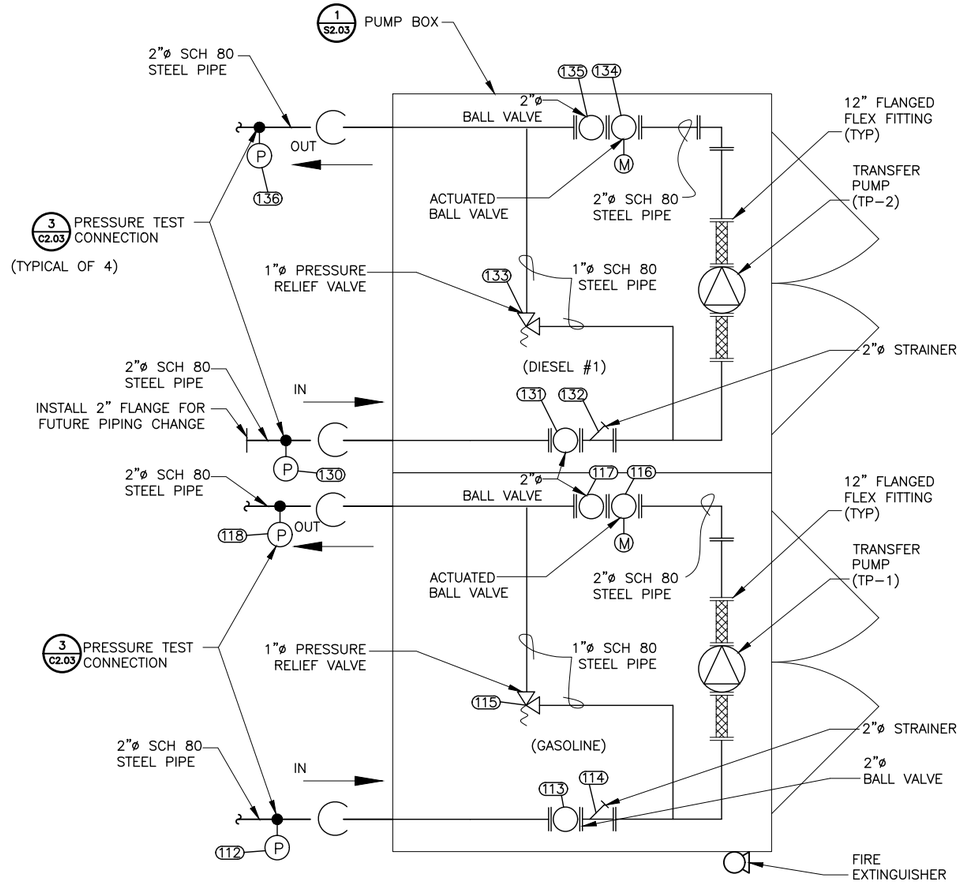
2 C2.03 PIPE SUPPORT

SCALE: NOT TO SCALE



3 C2.03 PRESSURE TEST CONNECTION

SCALE: NOT TO SCALE



4 C2.03 PUMP BOX PIPING SCHEMATIC

SCALE: NOT TO SCALE

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SHEET TITLE
DISPENSER STATION PIPING PLAN AND DETAILS

SHEET
C2.03

DRAWN BY:	CHECKED BY:
KK	MRS
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER: 20-017

LAYOUT
DISPENSING-PIPING

DATE TIME
10/29/2020 1:53 PM

DRAWING LOCATION
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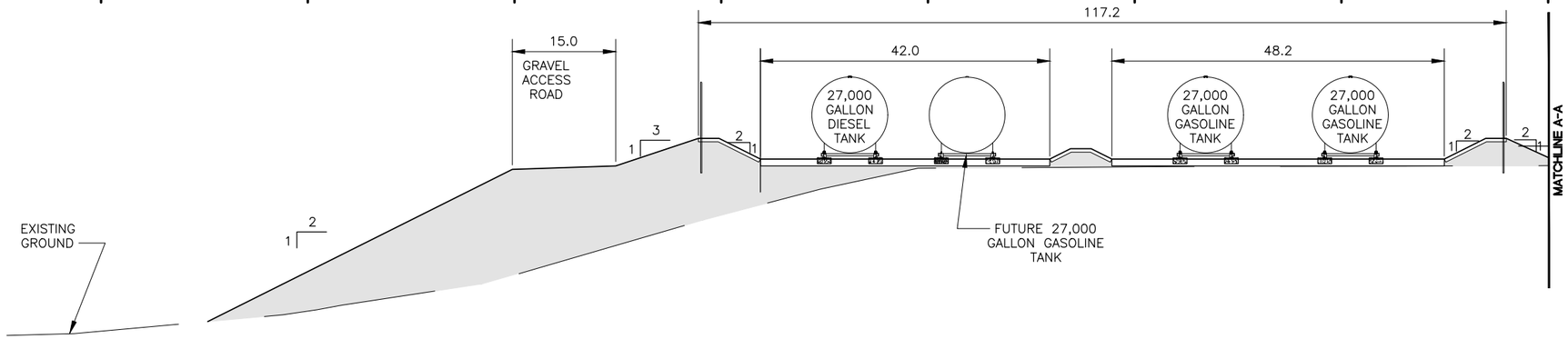
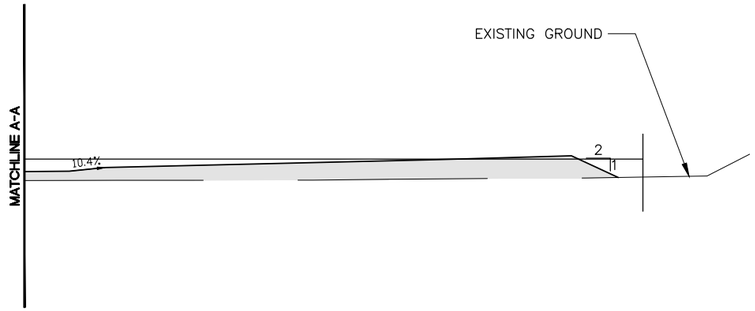
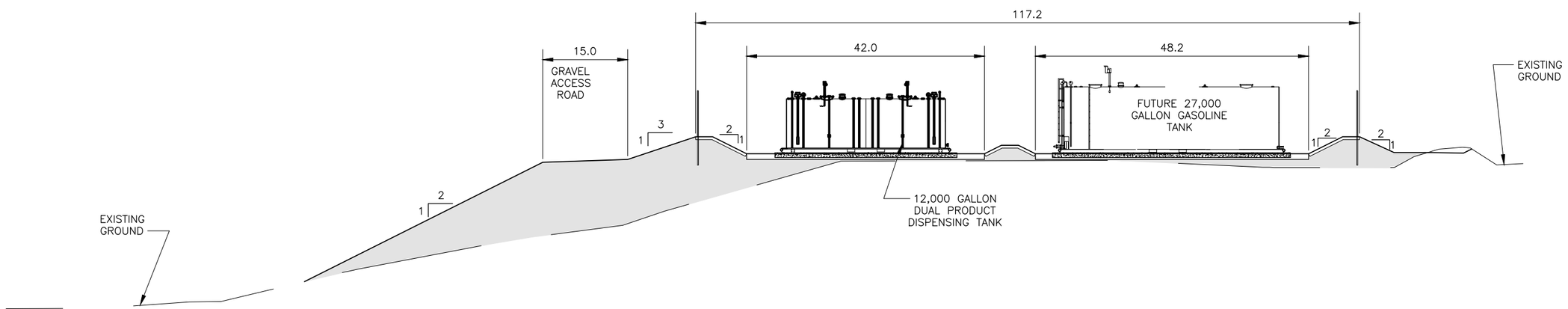




A C3.01 SECTION - TANK FARM

SCALE: 1" = 10.0'



B C3.01 SECTION - TANK FARM

SCALE: 1" = 10.0'

REVISIONS		
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SCAMMON BAY, ALASKA

SHEET TITLE
SECTIONS TANK FARM

SHEET
C3.01

DRAWN BY:	CHECKED BY:
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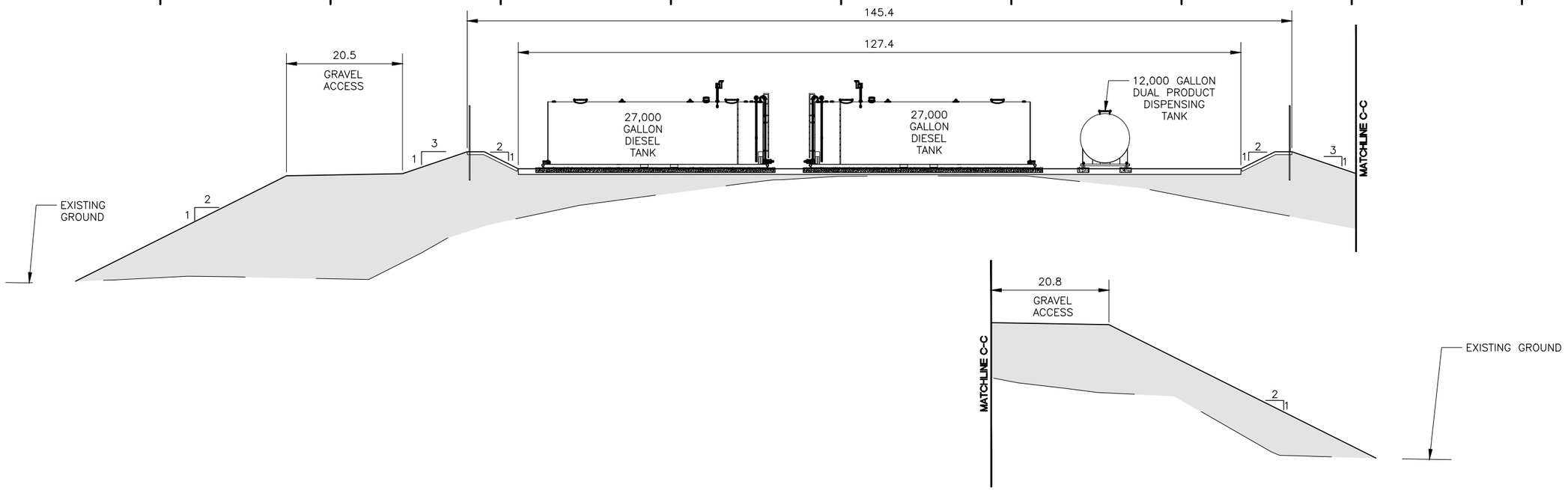
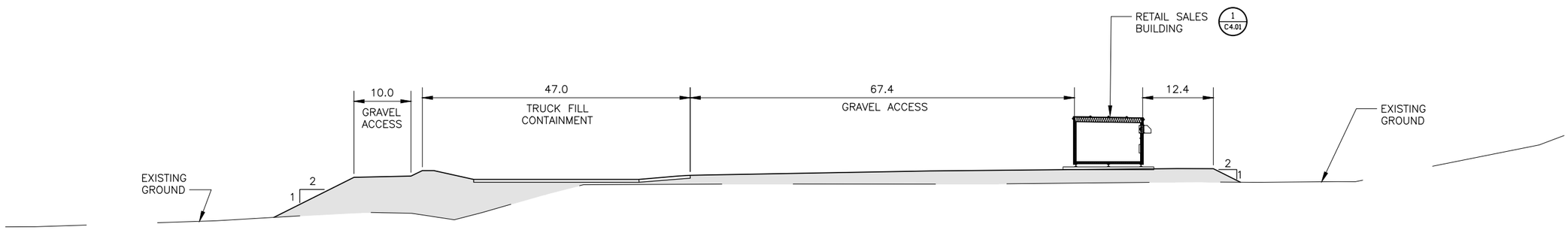
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER: 20-017



C/C3.02 SECTION - TANK FARM

SCALE: 1" = 10.0'



D/C3.02 SECTION - TANK FARM

SCALE: 1" = 10.0'

LAYOUT SEC-2

DATE TIME 10/29/2020 1:08 PM

DRAWING LOCATION H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\20-017_00_SP-DIRT-SECTIONS.dwg KKORNEGAY

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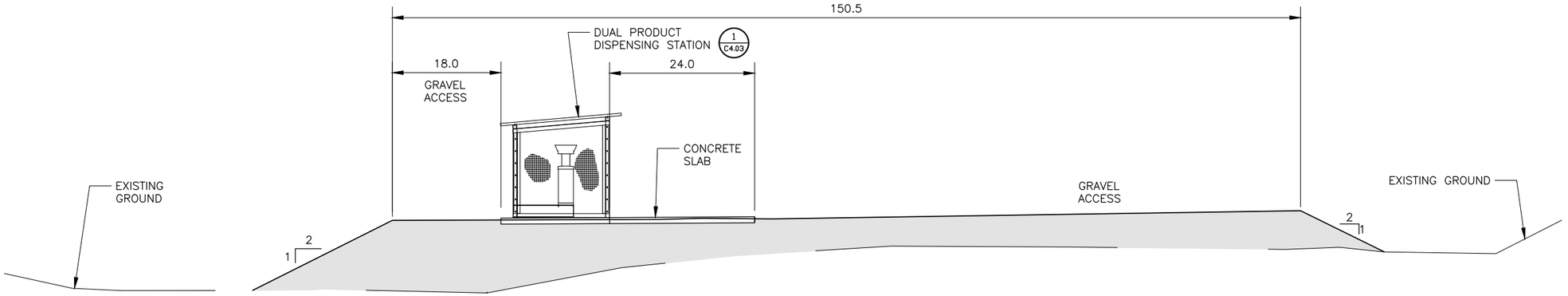
SHEET TITLE
SECTIONS
TANK FARM

SHEET
C3.02

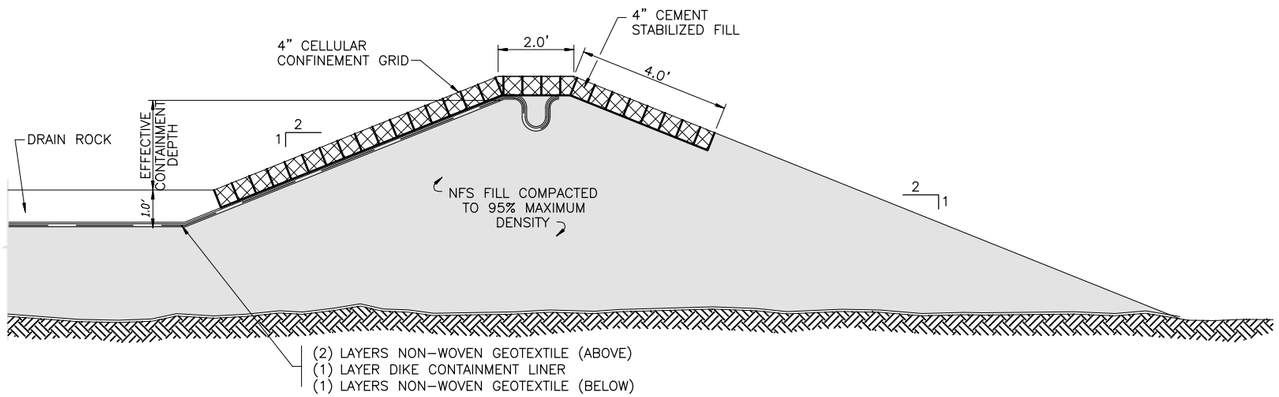
DRAWN BY:	CHECKED BY:
KK	MRS
DATE: 09/30/20	SCALE: AS SHOWN

JOB NUMBER: 20-017



E / C3.03 SECTION - TANK FARM

SCALE: 1" = 5.0'



1 / C3.03 SECTION - EARTHEN DIKE CONTAINMENT

SCALE: NTS

LAYOUT SEC-3

DATE TIME 10/29/2020 1:08 PM

DRAWING LOCATION H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\20-017_00_SP-DIRT-SECTIONS.dwg KKORNEGAY

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SHEET TITLE
SECTIONS
TANK FARM

SHEET
C3.03

DRAWN BY:	CHECKED BY:
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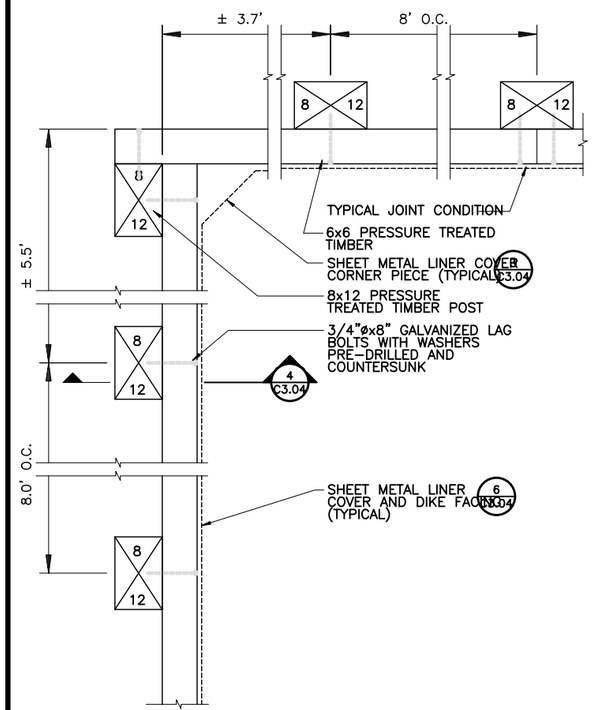
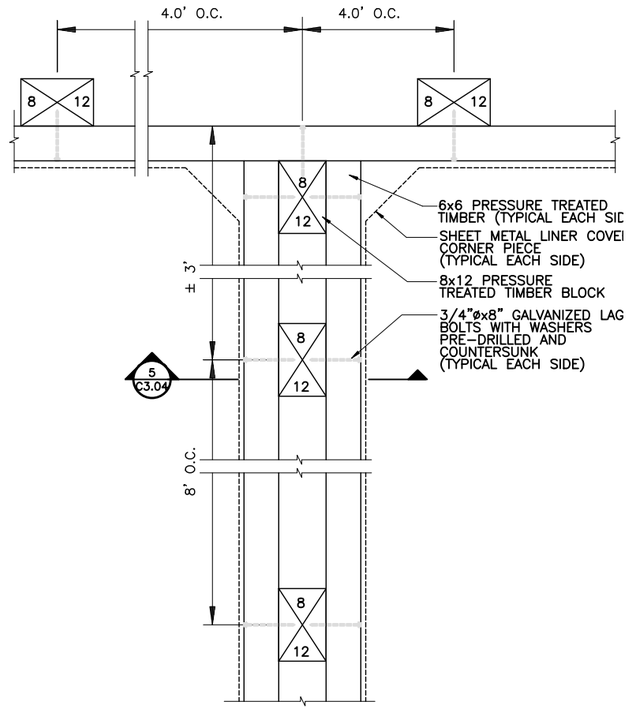
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER: 20-017



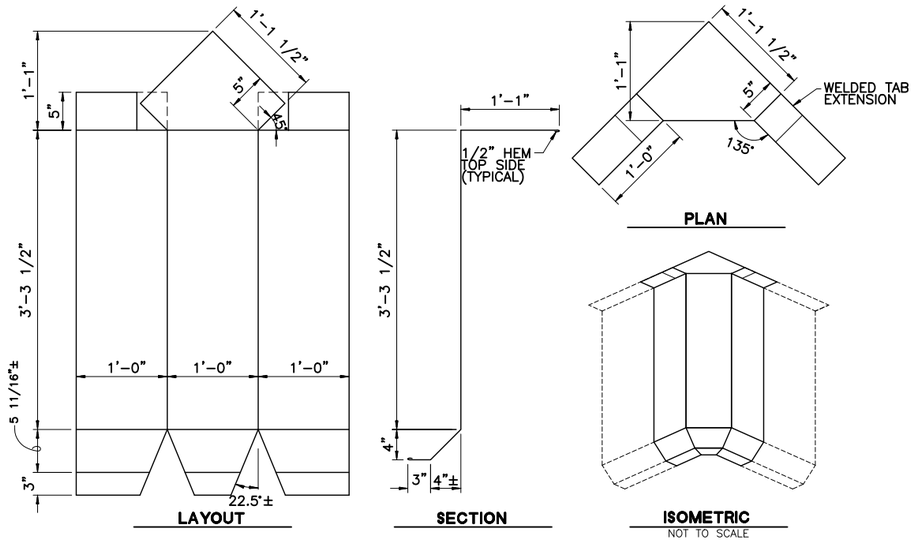
1 TIMBER DIKE CORNER DETAIL
C3.04 SCALE: NTS



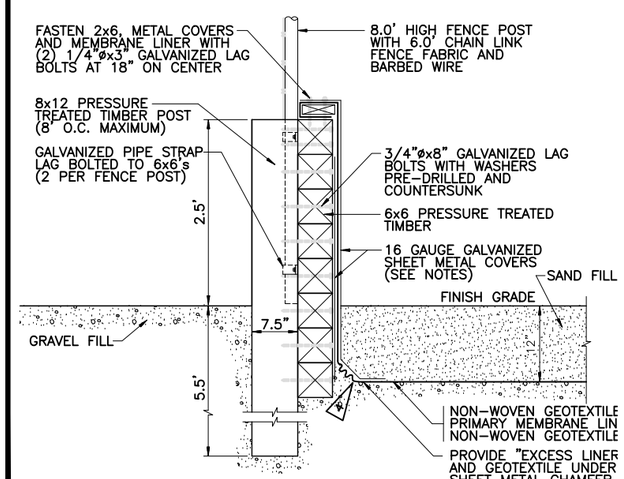
2 INTERIOR TIMBER DIKE DETAIL
C3.04 SCALE: NTS

NOTES

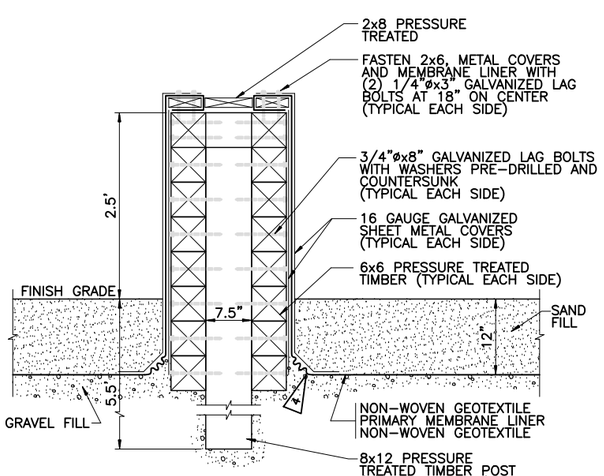
1. SEE STANDARD EQUIPMENT AND MATERIALS DRAWING FOR ADDITIONAL SPECIFICATIONS.
2. NO PENETRATIONS ALLOWED THROUGH MEMBRANE LINER EXCEPT AT TOP OF DIKE.
3. ATTACH INNER CONTAINMENT DIKE SHEET METAL COVER WITH COUNTER SUNK SCREWS SUCH THAT HEADS OF SCREWS ARE FLUSH WITH COVER. SEAL SCREWS AND JOINTS WITH FUEL RESISTANT CAULKING.
4. OVERLAP VERTICAL INNER AND OUTER CONTAINMENT DIKE SHEET METAL COVER JOINTS 2" (MINIMUM) AND SEAL WITH FUEL RESISTANT CAULKING.
5. ALLOW 3" MINIMUM OF EXCESS LINER AT BASE OF DIKES FOR SETTLEMENT AND EXPANSION.



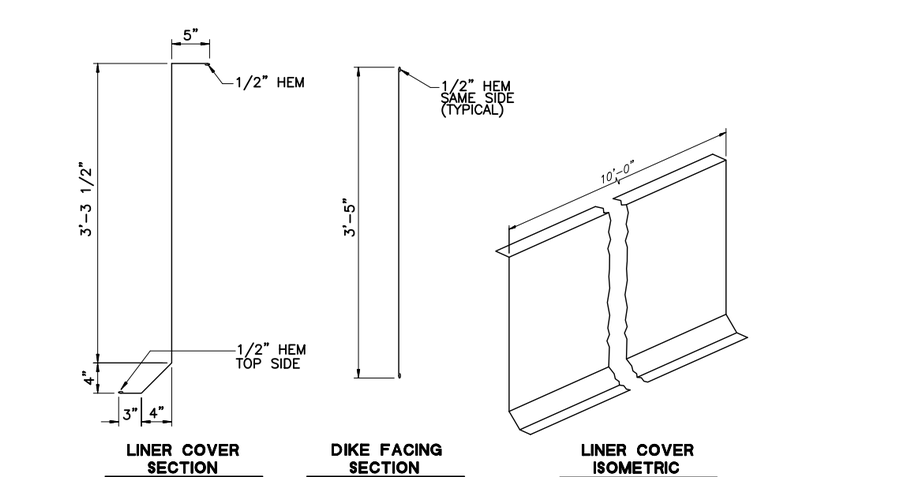
3 SHEET METAL LINER COVER CORNER DETAILS
C3.04 SCALE: NTS



4 EXTERIOR TIMBER DIKE DETAIL
C3.04 SCALE: 1" = 1'



5 INTERIOR TIMBER DIKE DETAIL
C3.04 SCALE: 1" = 1'



6 SHEET METAL LINER COVER DIKE FACING DETAILS
C3.04 SCALE: NTS

LAYOUT C3.04
DATE TIME 9/9/2020 3:57 PM
DRAWING LOCATION H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\401-tcdd.dwg SBROWNING

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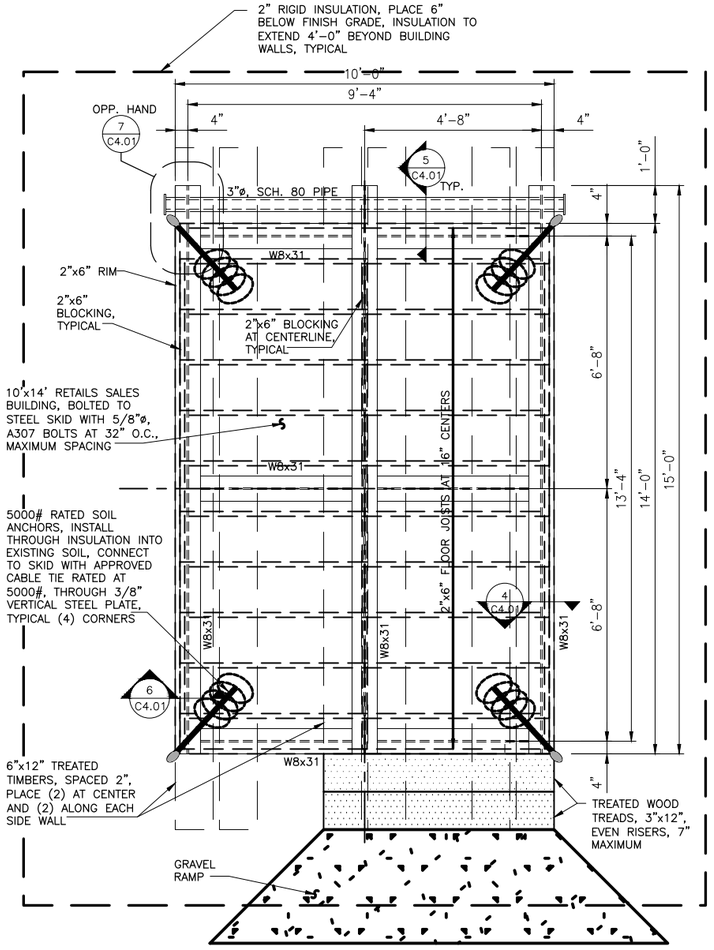
ALASKA ENERGY AUTHORITY
SCAMMON BAY, ALASKA

SHEET TITLE
TANK FARM TIMBER DIKE CONTAINMENT DETIALS

SHEET
C3.04

DRAWN BY:	CHECKED BY:
KK	MRS
DATE:	SCALE:
09/30/20	AS SHOWN

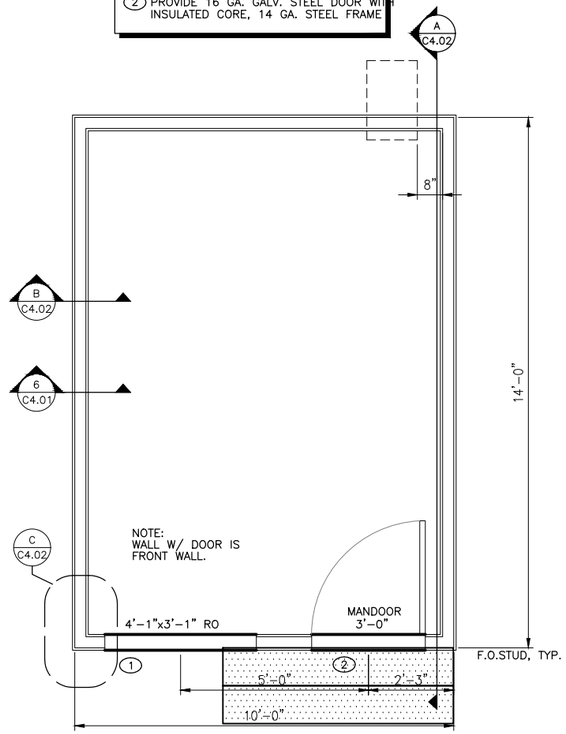
JOB NUMBER: 20-017



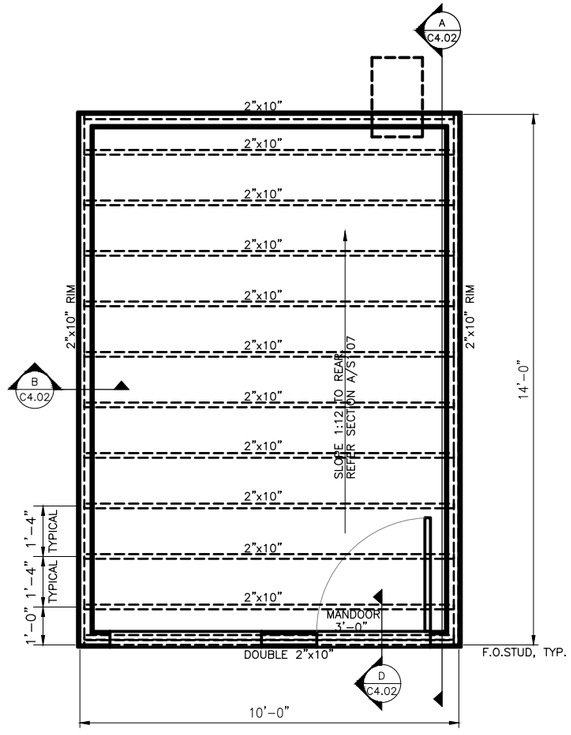
1 FOUNDATION, SKID AND FLOOR PLAN
C4.01 SCALE: 1/2" = 1'-0"

SHEET NOTES

1. WINDOW SHALL BE THERMAL GLASS WIT VINYL FRAME AND OPERABLE SLIDER PROVIDE EXTRA SECURITY SCREEN WITH WINDOW
2. PROVIDE 16 GA. GALV. STEEL DOOR WITH INSULATED CORE, 14 GA. STEEL FRAME



2 RETAIL SALES BUILDING FLOOR PLAN
C4.01 SCALE: 1/2" = 1'-0"



3 ROOF FRAMING PLAN
C4.01 SCALE: 1/2" = 1'-0"

NOTES:

1. SEE SHEET G1.03 FOR GENERAL NOTES, ABBREVIATIONS, LEGEND.

BUILDING CODE: 2006 INTERNATIONAL BUILDING CODE

DESIGN LIVE LOADS:

1. FLOOR 125 PSF , LIGHT STORAGE.

2. SNOW LOADS: FLAT SNOW LOAD, PF = 60 PSF.

3. WIND LOADS: BASIC WIND SPEED (3 SEC. GUST), V3S = 130 MPH; WIND IMPORTANCE FACTOR, IW = 1.15.

4. PROVIDE FIRE EXTINGUISHERS FOR THE RETAIL SALES BUILDING PER THE INTERNATIONAL FIRE CODE AND THE INTERNATIONAL BUILDING CODE.

SEISMIC LOADING:

SEISMIC USE GROUP = III. SHORT PERIOD RESPONSE ACCELERATION, SDS = 0.400. ONE SECOND PERIOD RESPONSE ACCELERATION, SD1 = 0.25. SEISMIC SITE CLASS = D. SEISMIC DESIGN CATEGORY D. SEISMIC ANALYSIS USED "EQUIVALENT LATERAL FORCE ANALYSIS" – SECTION 9.5.5, ASCE 7

FOUNDATIONS:

1. FOUNDATIONS HAVE BEEN DESIGNED ASSUMING NON-FROST-SUSCEPTIBLE SANDS AND GRAVELS PLACED OVER INSULATION AND WOVEN GEOTEXTILE PLACED ON EXISTING GROUND AS DELINEATED ON DRAWING C1.01. THE BUILDINGS ARE SUPPORTED WITH TREATED WOOD TIMBER MUD SILLS WITH (4) SOIL ANCHORS PER BUILDING. THIS TYPE OF FOUNDATION MAY REQUIRE LEVELING OVER THE LIFE OF THE STRUCTURE.

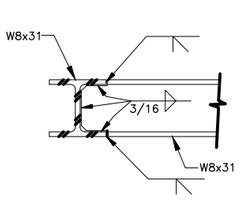
WOOD (LIGHT FRAMING):

1. PLYWOOD ROOF DECK AND WALL SHEATHING SHALL BE CDX WITH EXTERIOR GLUE, OR BETTER, UNLESS OTHERWISE NOTED ON THE DRAWINGS. ¾" PLYWOOD CALLED OFF SHALL HAVE A PANEL SPAN RATING OF 32/16. MINIMUM NAILING FOR ROOF PANELS SHALL EQUAL 10D NAILS AT 4" CENTERS AROUND PLYWOOD PANEL EDGE AND 10D'S @ 12" CENTERS ALONG INTERMEDIATE FRAMING. MINIMUM NAILING FOR WALL PANELS SHALL BE 10D'S @ 4" CENTERS AROUND PLYWOOD PANELS AND 10D'S @ 12" CENTERS ALONG INTERMEDIATE FRAMING. BLOCK ALL WALL PANEL EDGES.

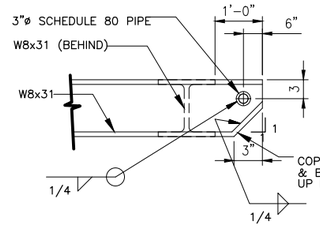
2. FRAMING MATERIAL, DOUGLAS FIR, NO. 2, OR BETTER. MAXIMUM MOISTURE CONTENT SHALL BE 19%.

3. ALL WOOD IN DIRECT CONTACT WITH GROUND OR FOUNDATION CONCRETE SHALL BE PRESSURE TREATED NO. 1 DOUGLAS FIR AND MARKED WITH THE "FDN" GRADE MARK. FIELD TREAT ALL CUT EDGES. MAXIMUM MOISTURE CONTENT SHALL BE 19%. ALL FASTENERS IN TREATED WOOD SHALL BE HOT DIPPED GALVANIZED.

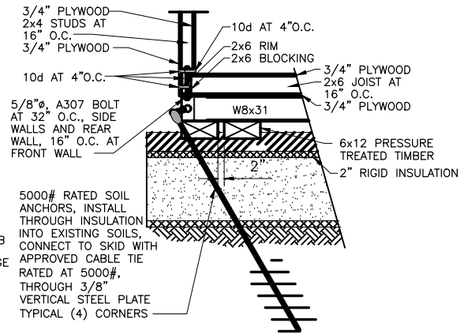
NOTES CONTINUED ON C4.02



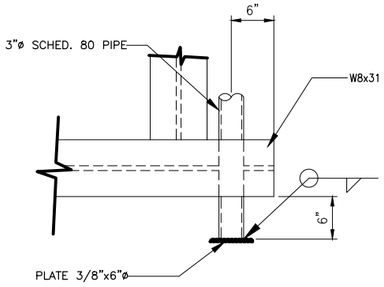
4 TYP SECTION
C4.01 SCALE: NONE



5 SECTION
C4.01 SCALE: NONE



6 TYPICAL SECTION
C4.01 SCALE: NONE



7 DETAIL
C4.01 SCALE: NONE

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ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES

SCAMMON BAY, ALASKA

SHEET TITLE: RETAIL SALES BUILDING FLOOR PLAN

SHEET: C4.01

DRAWN BY:	CHECKED BY:
AVEC	DGT
DATE:	SCALE:
09/30/20	AS SHOWN

JOB NUMBER: 20-017

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DATE/TIME 10/2/2020 4:15 PM
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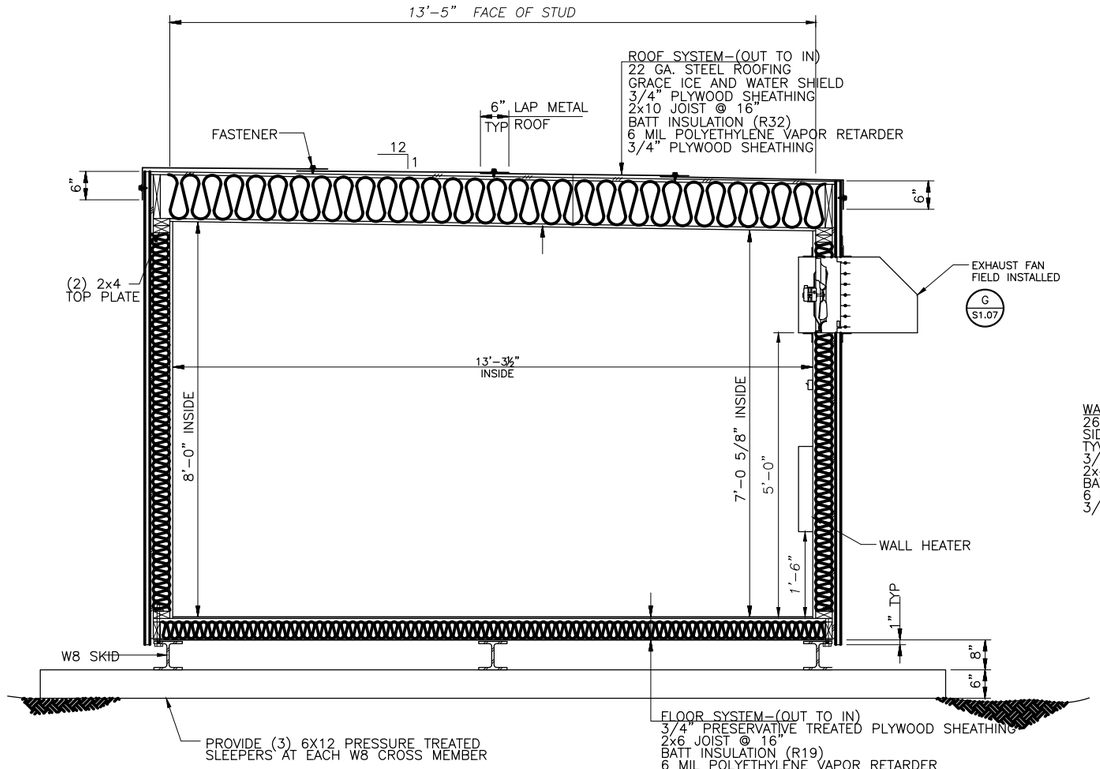
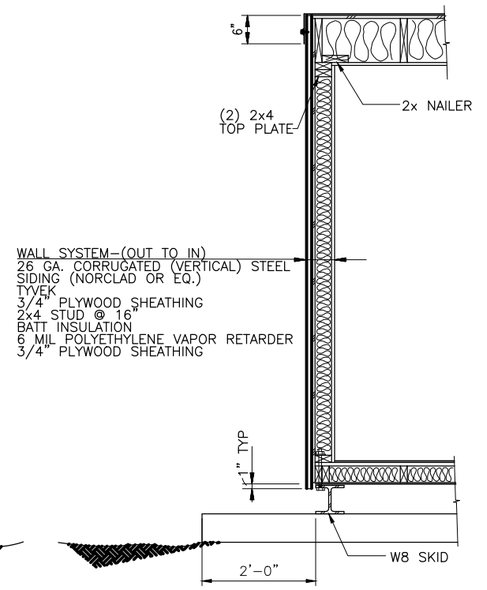


A MODULE SECTION
C4.02 SCALE: 3/4" = 1'-0"



B TYPICAL WALL SECTION
C4.02 SCALE: 3/4" = 1'-0"

CONT'D NOTES:

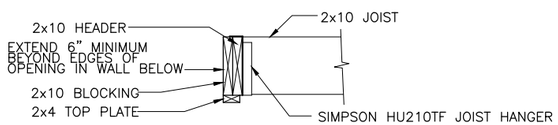
4. ALL METAL TO WOOD OR WOOD TO WOOD CONNECTIONS SHALL BE STANDARD OR AS DETAILED ON THE DRAWINGS USING A307 BOLTS. ALL BOLTS AND LAG SCREW IN CONTACT WITH WOOD SHALL HAVE 2"X2"X3/16" PLATE WASHERS AS A MINIMUM.
5. ALL METAL FRAMING ANCHORS AND HANGERS SHALL SUPPORT THE LOADS INDICATED ON THE DRAWINGS. UNLESS OTHERWISE DETAILED, HANGERS SHALL SUPPORT A NORMAL LOAD CAPACITY EQUAL TO THE SHEAR CAPACITY OF THE SUPPORTED MEMBER. ANCHORS AND HANGERS INDICATED ON THE DRAWINGS ARE "SIMPSON CO." OR EQUAL.
6. MINIMUM NAILING SHALL EQUAL THAT INDICATED IN THE INTERNATIONAL BUILDING CODE TABLE 2304.9.1, UNLESS OTHERWISE INDICATED ON THE DRAWINGS.

STRUCTURAL STEEL:

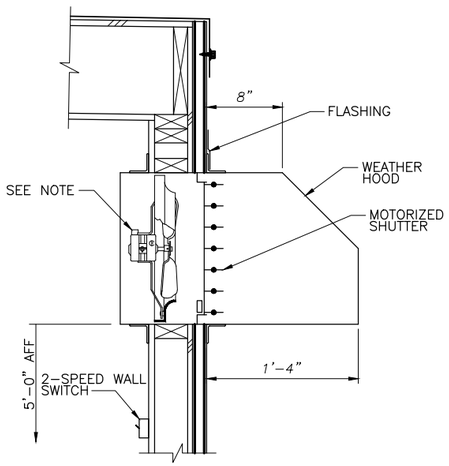
1. THE DESIGN, FABRICATION AND ERECTION OF ALL STRUCTURAL STEEL SHALL COMPLY WITH THE CODE OF STANDARD PRACTICE OF THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION AND AS SPECIFIED IN THE PROJECT MANUAL.

NOTES:

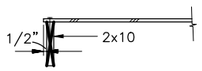
1. SEE SHEET G1.03 FOR GENERAL NOTES, ABBREVIATIONS, LEGEND.
2. CONTRACTOR TO DESIGN AND CONSTRUCT RETAILS SALES BUILDING PER INFORMATION PROVIDED ON THIS SHEET.
3. CONTRACTOR SHALL PROVIDE SHOP DRAWING PRIOR TO FABRICATION.



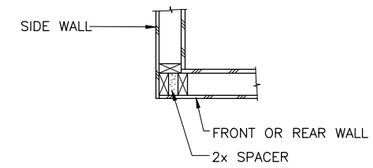
E TYPICAL HEADER DETAIL
C4.02 SCALE: 3/4" = 1'-0"



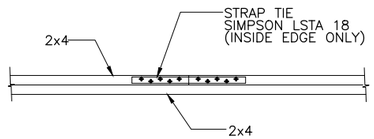
G EXHAUST FAN DETAIL
C4.02 SCALE: 1 1/2" = 1'-0"



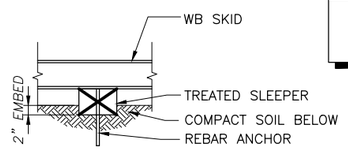
C TYPICAL CORNER SECTION
C4.02 SCALE: 3/4" = 1'-0"



D ROOF SHEATHING EDGE DETAIL
C4.02 SCALE: 3/4" = 1'-0"



F TOP PLATE SPLICE ELEVATION
C4.02 SCALE: 3/4" = 1'-0"



H SLEEPER DETAIL
C4.02 SCALE: 3/4" = 1'-0"

ROOFING AND SIDING ATTACHMENT SCHEDULE

ROOFING:	EDGE:	#14x1 1/2" SCREW @ 6" O.C.
	SEAM:	#14x1 1/2" SCREW @ 6" O.C.
SIDING:	EDGE:	#14x1 1/2" SCREW @ 6" O.C.
	SEAM:	#14x1 1/2" SCREW @ 10" O.C.

NAILING SCHEDULE

LOCATION	PANEL EDGE NAILING	PANEL FIELD NAILING
ROOF	10d @ 6" O.C.	10d @ 12" O.C.
WALL	10d @ 6" O.C.	10d @ 12" O.C.
FLOOR	10d @ 6" O.C.	10d @ 12" O.C.

NOTE

1. EXHAUST FAN: PACKAGED PROPELLER EXHAUST FAN WITH WALL SLEEVE, WIRE GUARD, MOTORIZED DAMPER, WEATHER GUARD. COOK SPD-105P15D, 1/20 HP ODP MOTOR, 115 VOLT WITH 115 VOLT MOTORIZED DAMPER.

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SHEET TITLE
RETAIL SALES BUILDING DETAILS

SHEET
C4.02

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JOB NUMBER: 20-017

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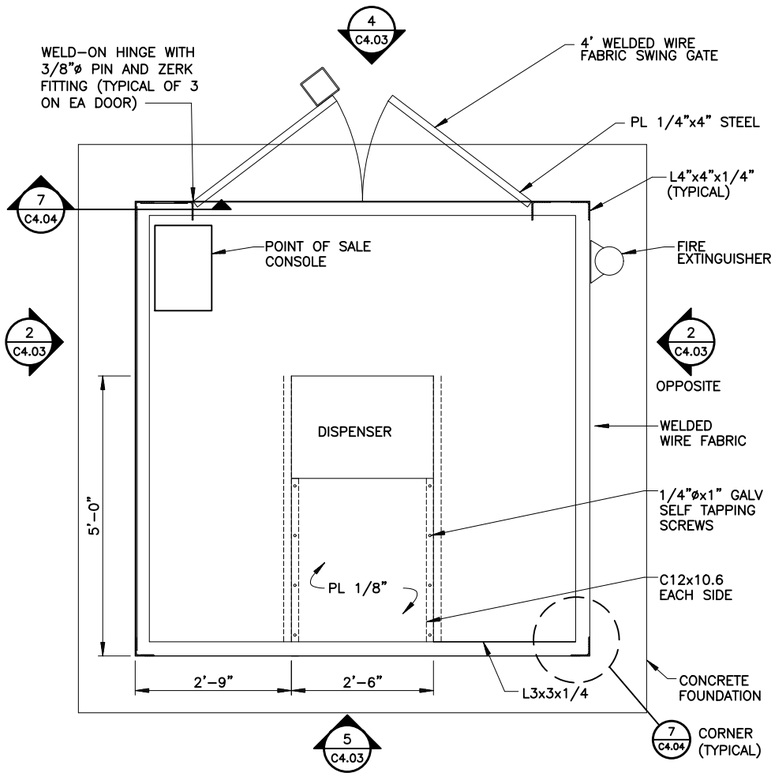
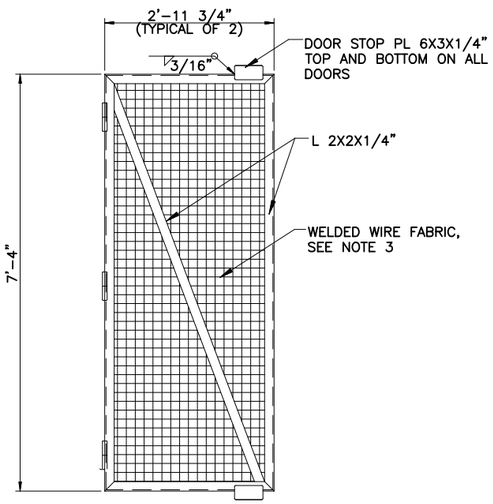
DATE TIME 10/2/2020 4:15 PM
DRAWING LOCATION H:\Jobs\20-017 Scammon Bay BFU\CAD\Drawings\20-017_00_S107-RETAIL.dwg KKORNEGAY



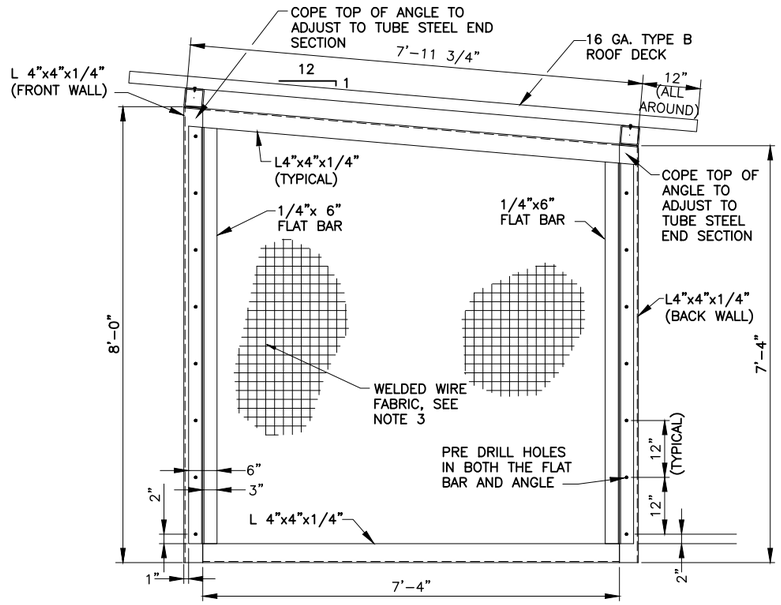
1 C4.03 PHASE I - DISPENSER ENCLOSURE - PLAN VIEW

SCALE: 3/4" = 1'-0"



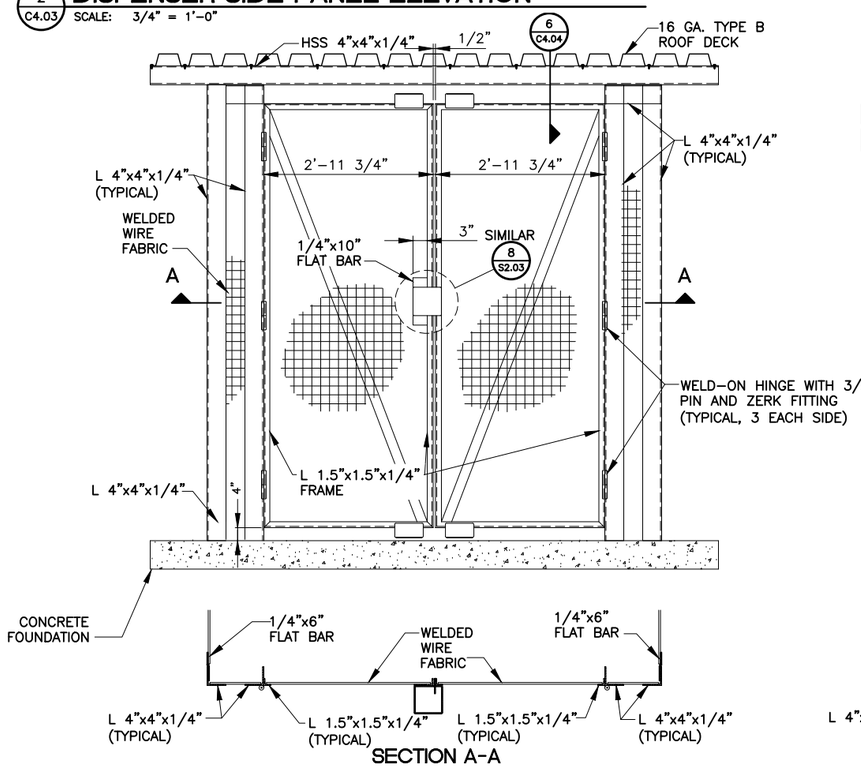
3 C4.03 DOOR FRAME

SCALE: 3/4" = 1'-0"



2 C4.03 DISPENSER SIDE PANEL ELEVATION

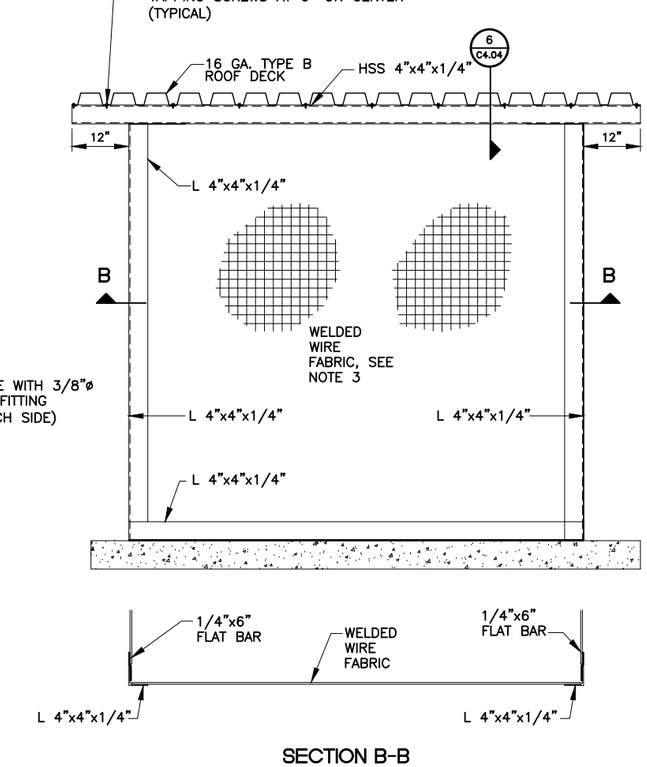
SCALE: 3/4" = 1'-0"



SECTION A-A

4 C4.03 DISPENSER FRONT PANEL ELEVATION

SCALE: 3/4" = 1'-0"



SECTION B-B

5 C4.03 DISPENSER BACK PANEL ELEVATION

SCALE: 3/4" = 1'-0"

NOTES:

1. SEE SHEET G1.03 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. HOT DIP GALVANIZE STRUCTURE, FLOOR, AND DISPENSER BASE IN ACCORDANCE WITH THE SPECIFICATIONS.
3. 4" SQUARE WIRE MESH WITH 3/8" WIRE. McNICHOLS CATALOG WITH GALVANIZE COATING.
4. PROVIDE FIRE EXTINGUISHERS FOR THE DISPENSERS IN ACCORDANCE WITH SPECIFICATIONS.
5. ALL WORK ASSUMED SCHEDULE A, UNLESS OTHERWISE NOTED.

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SCAMMON BAY, ALASKA

SHEET TITLE
DISPENSER ENCLOSURE FRAMING PLAN AND ELEVATIONS

SHEET
C4.03

DRAWN BY:	CHECKED BY:
KK	MRS
DATE:	SCALE:
09/30/20	AS NOTED

JOB NUMBER: 20-017

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DATE, TIME 10/2/2020 4:15 PM
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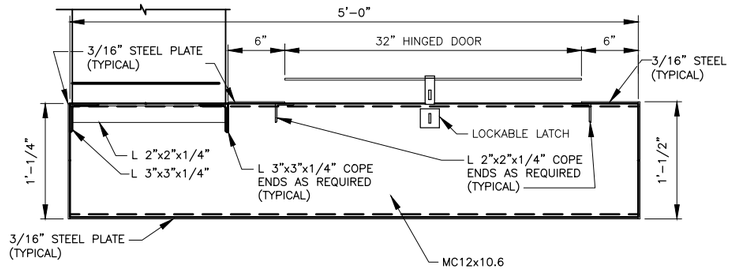
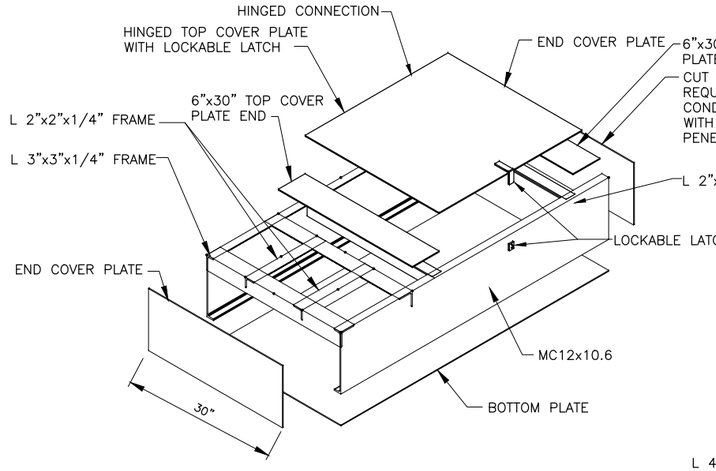


NOTES:

1. END COVER PLATES, BOTTOM PLATE, AND 6"x30" TOP COVER PLATE ENDS SHALL BE 1/8" FILLET SEAL WELDED.
2. TOP COVER PLATE HINGE AND LOCKABLE LATCH SHALL BE WELD ATTACHED.
3. DISPENSER BASE SHALL BE BOLTED TO THE DISPENSER BUILDING CONCRETE FOUNDATION WITH $\frac{1}{2}$"ø x 4" ANCHOR BOLTS AND WASHERS SET IN EPOXY. SEE (5 / C4.04)

1 / C4.04 ELEVATION - DISPENSER BASE

SCALE: 3/4" = 1'-0"

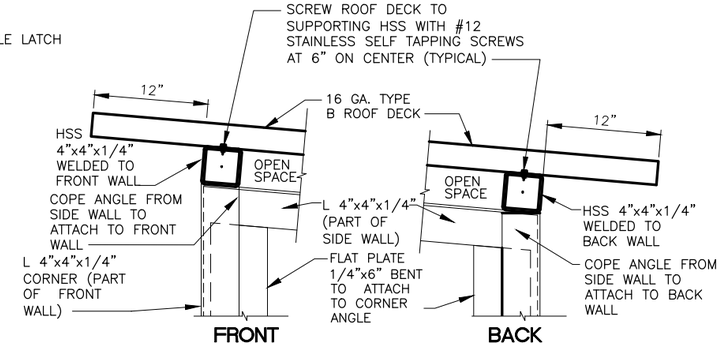


3 / C4.04 ISOMETRIC - DISPENSER BASE

SCALE: NOT TO SCALE

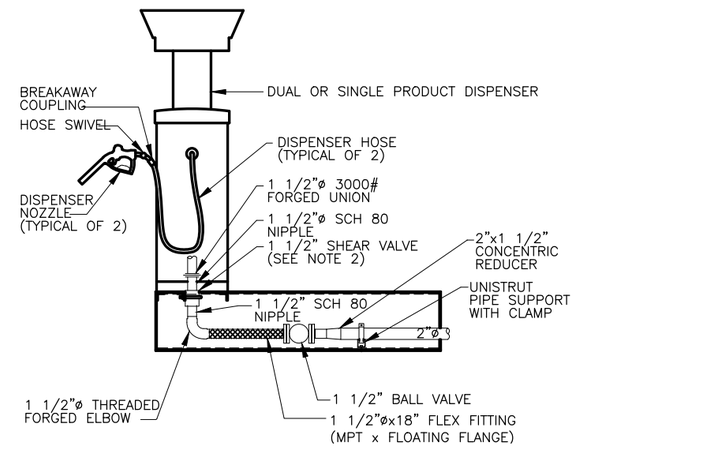
NOTES:

1. SEE SHEET G1.03 FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. SET SHEAR VALVE WITH PLANE OF SHEAR AT TOP OF DISPENSER MOUNT.
3. HOT DIP GALVANIZE STRUCTURE, FLOOR, AND DISPENSER BASE INCLUDING BOLTS, NUTS, AND WASHERS IN ACCORDANCE WITH THE SPECIFICATIONS.
4. ALL WORK ASSUMED SCHEDULE A, UNLESS OTHERWISE NOTED.



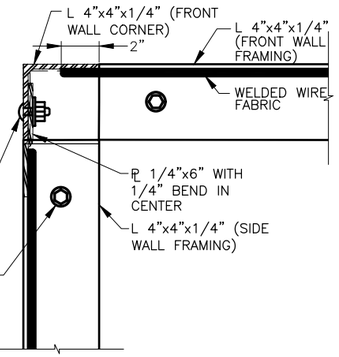
6 / C4.04 ROOF CONNECTION DETAIL

SCALE: 1 1/2" = 1'-0"



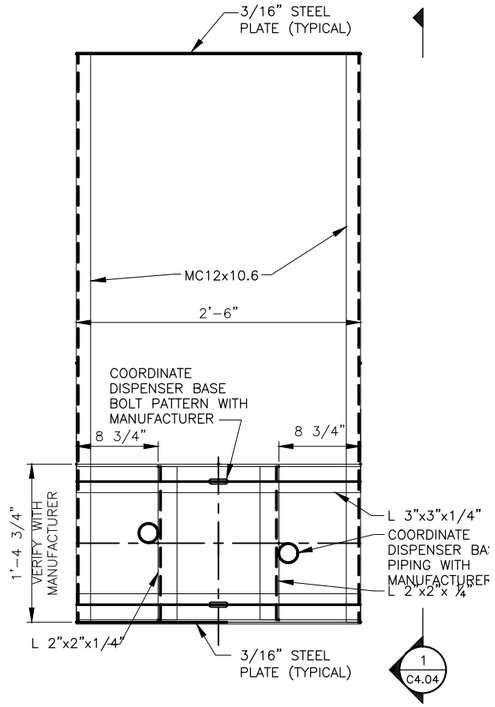
4 / C4.04 DISPENSER SECTION

SCALE: NONE



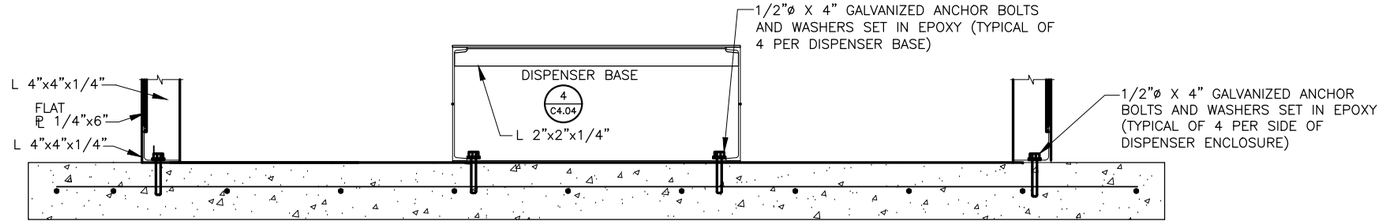
7 / C4.04 CORNER SECTION

SCALE: 3" = 1'-0"



2 / C4.04 PHASE I - PLAN - DISPENSER BASE

SCALE: 3/4" = 1'-0"



5 / C4.04 FRAMING SECTION

SCALE: 1 1/2" = 1'-0"

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SHEET TITLE: DISPENSER ENCLOSURE SECTIONS AND DETAILS

SHEET: C4.04

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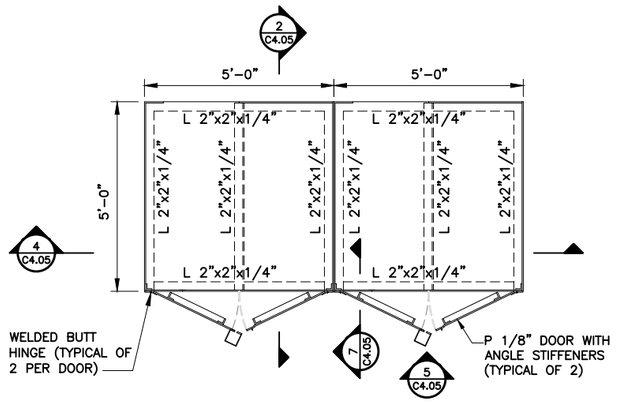
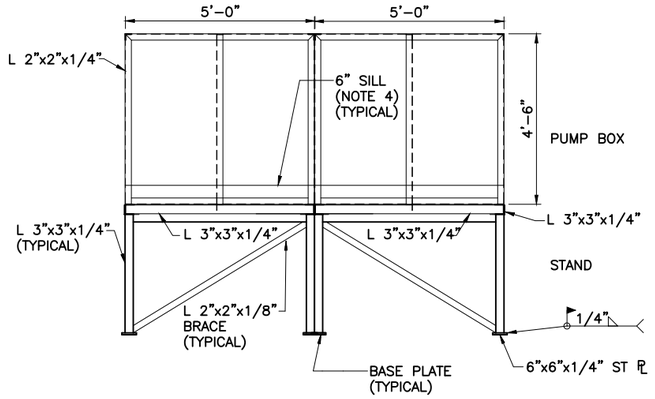


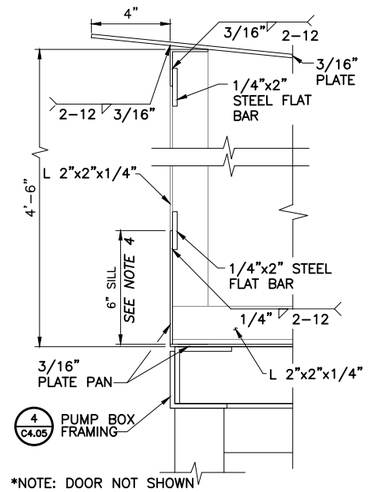
1 C4.05 TANK FARM - PUMP BOX ROOF FRAMING PLAN

SCALE: 1/2" = 1'-0"



4 C4.05 TANK FARM - PUMP BOX FRAMING SECTION

SCALE: 1/2" = 1'-0"

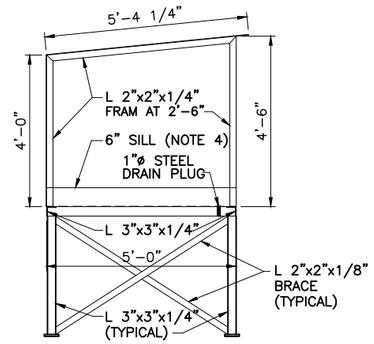


7 C4.05 DOOR OPENING SECTION

SCALE: 3" = 1'-0"

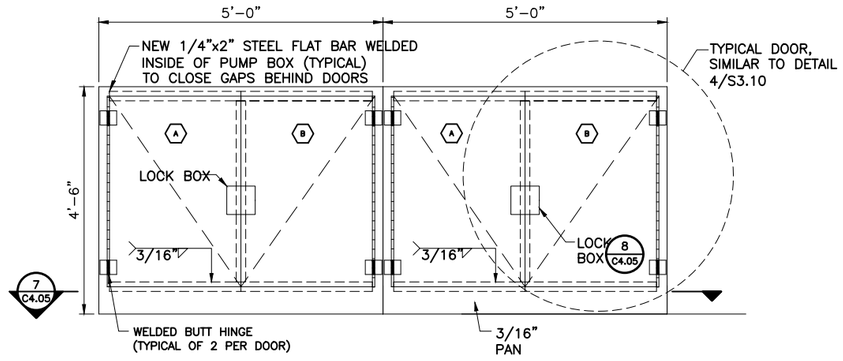
NOTES

1. SEE SHEET G1.03 FOR GENERAL NOTES, AND SPECIFICATIONS, LEGEND, AND ABBREVIATIONS.
2. ALL CONNECTIONS SHALL BE CONTINUOUSLY WELDED UNLESS OTHERWISE NOTED.
3. PUMP BOX SHALL BE FROM A36 STEEL.
4. PUMP BOX SHALL HAVE A 6" SILL FOR SECONDARY CONTAINMENT AND SHALL BE SEAL WELDED ALL AROUND, AND SHALL BE DRAINED VIA A 1"ø THREADED STEEL DRAIN PLUG.
5. PUMP BOX SHALL BE PAINTED PER SPECIFICATIONS.
6. MOUNT ALL EQUIPMENT AND PIPE SUPPORTS TO INVERTED CHANNELS WELDED TO THE BOTTOM OF ENCLOSURE. PROVIDE 6" MINIMUM CLEARANCE UNDERNEATH EQUIPMENT FOR ACCESS TO ALL MOUNTING BOLTS.
7. ALL WORK IS ASSUMED SCHEDULE A, UNLESS NOTED OTHERWISE.



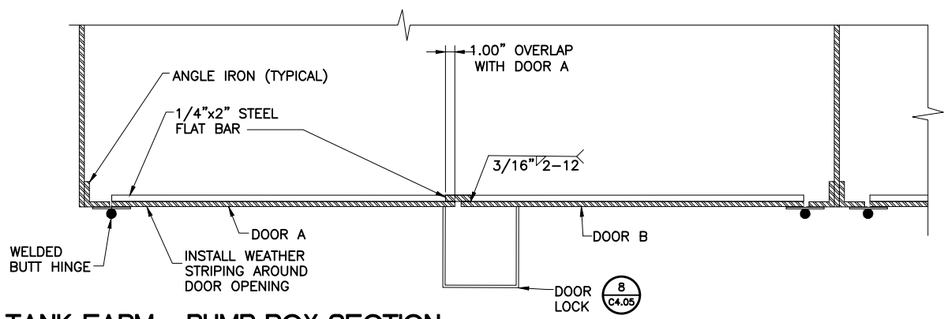
2 C4.05 TANK FARM - PUMP BOX SECTION

SCALE: 1/2" = 1'-0"



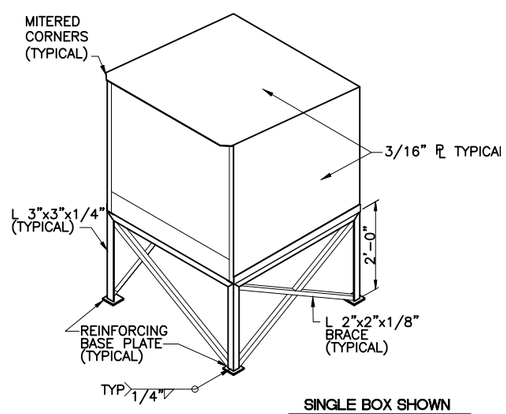
5 C4.05 TANK FARM - PUMP BOX ELEVATION

SCALE: 3/4" = 1'-0"



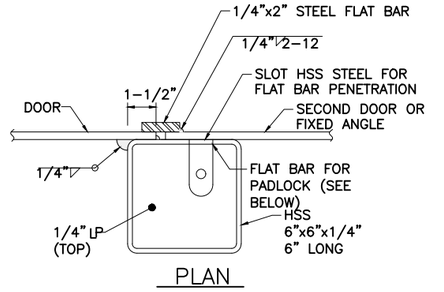
3 C4.05 TANK FARM - PUMP BOX SECTION

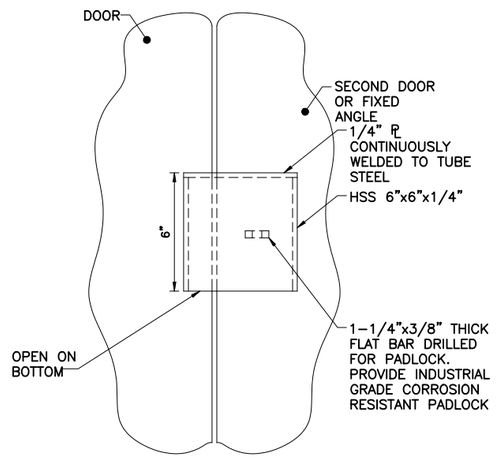
SCALE: 1 1/2" = 1'-0"



6 C4.05 PUMP BOX BASE ISOMETRIC

SCALE: NONE





8 C4.05 DOOR LOCK DETAIL

SCALE: 3" = 1'-0"

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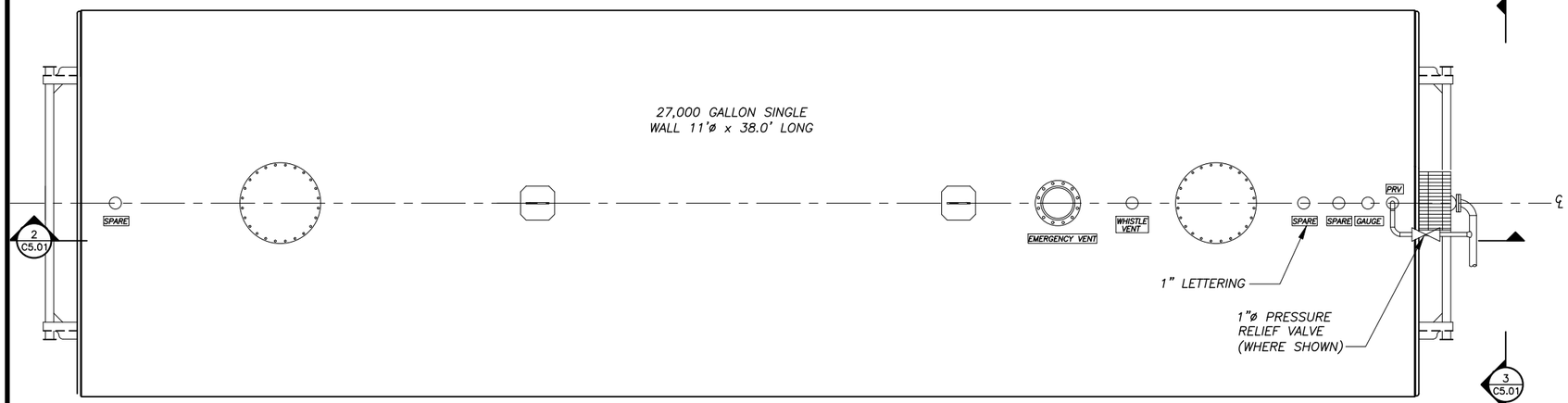
SCAMMON BAY, ALASKA

SHEET TITLE
TANK FARM PUMP BOX DETAILS

SHEET
C4.05

DRAWN BY:	CHECKED BY:
KK	DC
DATE: 09/30/20	SCALE: AS NOTED

JOB NUMBER: 20-017



1 C5.01 PLAN - 27,000 GALLON SINGLE WALL TANK

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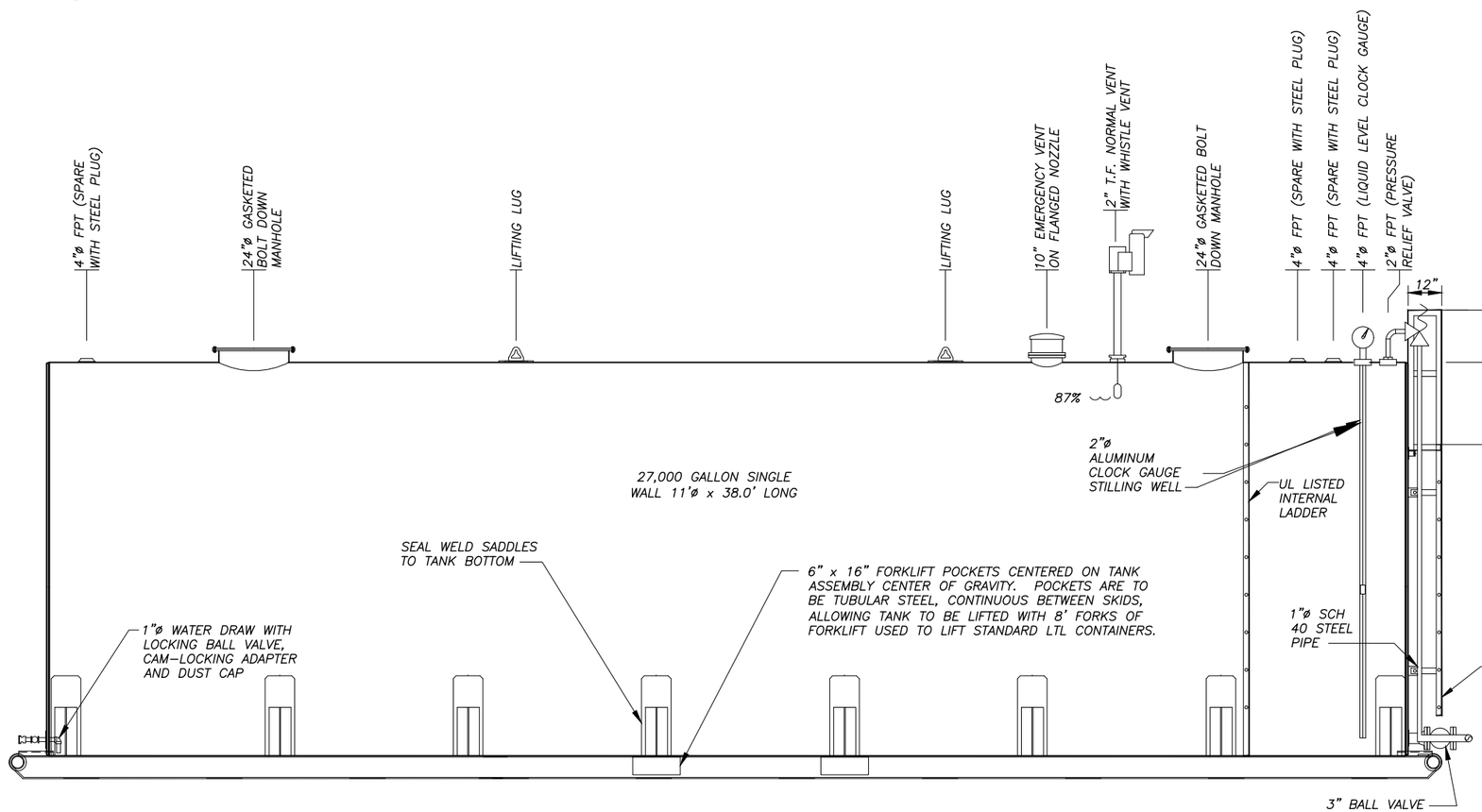

2 C5.01 SECTION - 27,000 GALLON SINGLE WALL TANK

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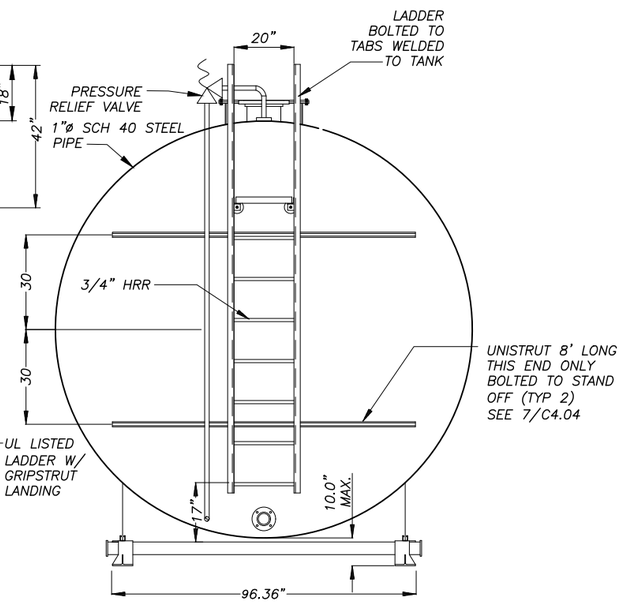

1 C5.01 END VIEW

SCALE: NONE

NOTES:

1. SEE SHEET G1.03 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.
2. TANKS SHALL BE UL142 LISTED AND LABELED.
3. PROVIDE LABELING ON TANK IN ACCORDANCE WITH THE INTERNATIONAL FIRE CODE, INCLUDING BUT NOT LIMITED TO:
   - PRODUCT IDENTIFICATION
   - COMPARTMENT STORAGE CAPACITY
   - TARE WEIGHT
   - NFPA 704
   - INTERNATIONAL FIRE CODE CHAPTER 34.
4. THIS DRAWING IS A PROTOTYPICAL TANK DRAWING. CONTRACTOR SHALL MODIFY BUNG LOCATIONS AS NECESSARY TO MATCH PIPING REQUIREMENTS. SUBMIT SHOP DRAWING WITH ANY PROPOSED REVISIONS HIGHLIGHTED FOR ENGINEER REVIEW.
5. TANKS SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE CURRENT VERSIONS OF UL142, STATE OF ALASKA FIRE AND LIFE SAFTEY REGULATIONS (13 AAC50), ASME B 31.3, ASME B 31.4, AND ASME B 31.4A.
6. LADDER, HANDRAILS, AND CATWALK MUST MEET ALL APPLICABLE OSHA STANDARDS. LADDERS, HANDRAILS AND CATWALK SHALL BE BOLT-ON UNITS. CONTRACTOR SHALL HOT DIP GALVANIZE EXISTING LADDERS, HANDRAILS AND AND CATWALK OR PROVIDE NEW GALVANIZED LADDERS, HANDRAILS AND CATWALK.
7. NORMAL VENT MUST BE MINIMUM OF 12 FEET ABOVE ADJACENT FINISH GRADE.
8. TANKS SADDLES AND SKIDS: PROVIDE TANK SADDLE AND SKID SYSTEMS DESIGNED IN ACCORDANCE WITH UL 142. TANK SADDLES AND SKIDS SHALL BE SUITABLE FOR SKIDDING EMPTY TANK INTO POSITION. PROVIDE A MINIMUM OF EIGHT SADDLES PER TANK. SKIDS SHALL BE W8x35 OR APPROVED EQUAL.
9. TANKS SHALL BE CONSTRUCTED OF ASTM A-36 PLATE AND STRUCTURAL STEAL AND PAINTED PER THE SPECIFICATIONS.

REVISIONS

MARK	DATE	DESCRIPTION

NOT FOR CONSTRUCTION

HDL ENGINEERING Consultants LLC
civil - geotechnical - surveying - environmental - material testing
ANCHORAGE 907.564.2120
MAT-SU 907.746.5230
3335 Arctic Boulevard, Suite 100 Anchorage, AK 99503
AECL861
www.HDLalaska.com

ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES

ALASKA ENERGY AUTHORITY

SCAMMON BAY, ALASKA

SHEET TITLE
27,000 GALLON SINGLE WALL BULK TANK

SHEET
C4.01

DRAWN BY:	CHECKED BY:
KK	MRS
DATE: 09/30/20	SCALE: NONE
JOB NUMBER: 20-017	

LAYOUT C4.01 - 27K TANK
DATE, TIME 10/2/2020 4:21 PM
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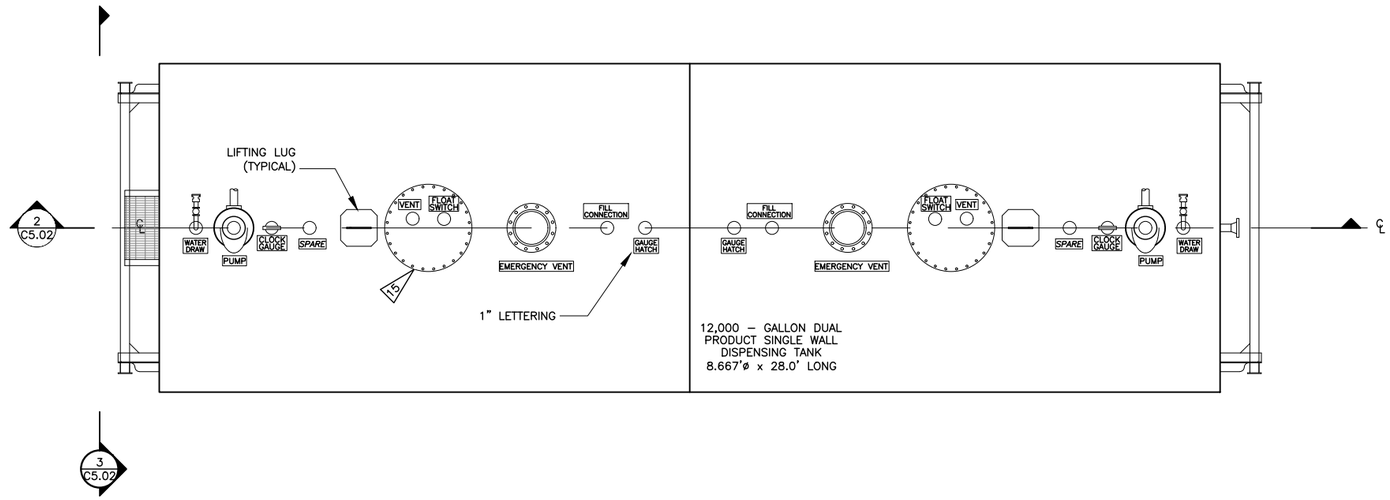
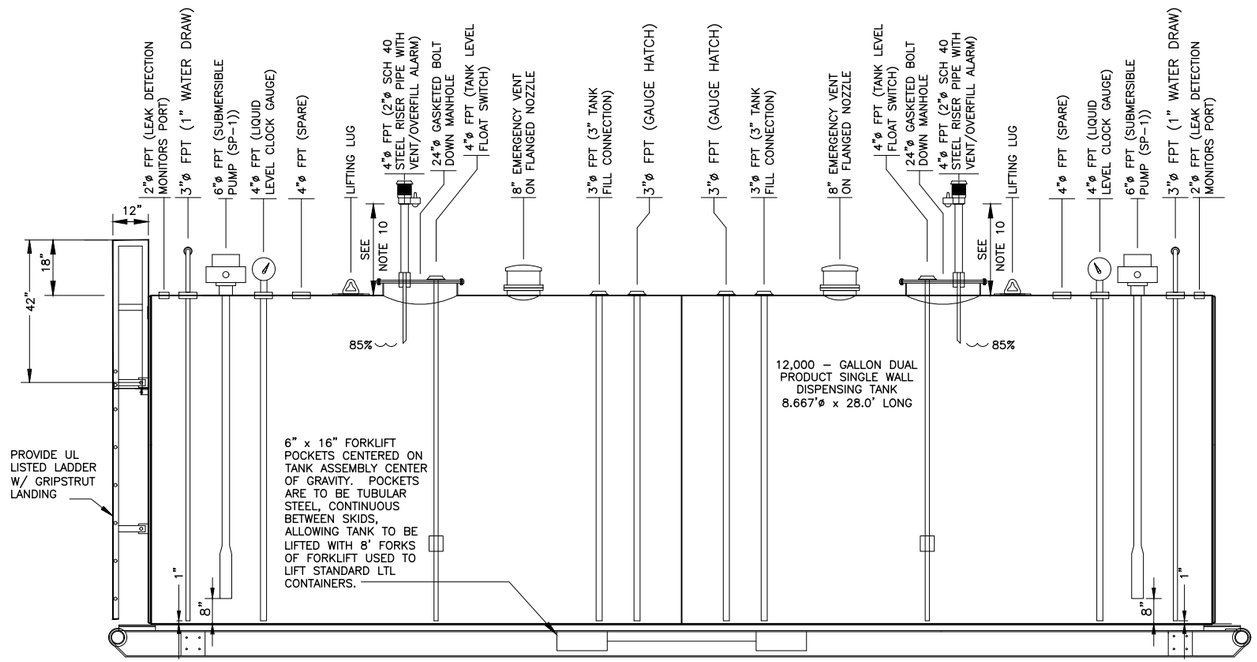


1 C5.02 PLAN VIEW – 12,000 – GALLON DUAL PRODUCT DISPENSING TANK

SCALE: NOT TO SCALE

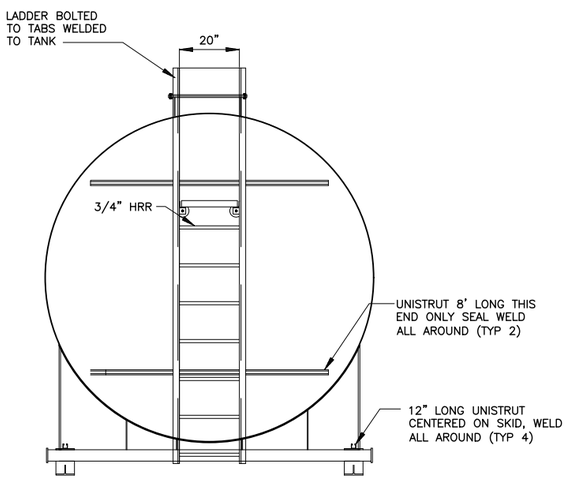


2 C5.02 SECTION – 12,000 – GALLON DUAL PRODUCT DISPENSING TANK

SCALE: NOT TO SCALE

NOTES:

1. SEE SHEET G1.03 AND FOR GENERAL NOTES, ABBREVIATIONS AND LEGEND.
2. THE TANK AND APPURTENANCES SHALL BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH THE STATE OF ALASKA FIRE AND LIFE SAFETY REGULATIONS (13 AAC50), ASME B31.3, ASME B31.4, AND B31.4A.
3. TANK SHALL BE NEW UL142 LISTED AND LABELED.
4. SHELL JOINTS WILL BE FULL PENETRATION BUTT WELDS PER U.L. 142, FIG. 6.1, NO. 3.
5. HEAD TO SHELL JOINTS WILL BE FULL FILLET LAP WELDS PER U.L. 142, FIG. 6.2, NO. 6.
6. TANK SHALL BE CONSTRUCTED OF ASTM A–36 PLATE AND STRUCTURAL STEEL.
7. TANK SADDLES AND SKIDS: PROVIDE TANK SADDLES AND SKID SYSTEMS DESIGNED IN ACCORDANCE WITH UL142. TANK SADDLES AND SKIDS SHALL BE SUITABLE FOR SKIDDING EMPTY TANK INTO POSITION AT SITE DURING INSTALLATION. PROVIDE A MINIMUM OF FOUR SADDLES. SKIDS SHALL BE W8x35, OR APPROVED EQUAL.
8. TANK SHALL BE EQUIPPED WITH EMERGENCY VENT.
9. PROVIDE LABELING ON TANK IN ACCORDANCE WITH THE INTERNATIONAL FIRE CODE, INCLUDING BUT NOT LIMITED TO:
   - PRODUCT IDENTIFICATION
   - COMPARTMENT STORAGE CAPACITY
   - TARE WEIGHT
   - NFPA 704
   - INTERNATIONAL FIRE CODE CHAPTER 34.
   - TANK #
   - FILL HEIGHT
10. ALL PRIMARY TANKS SHALL BE EQUIPPED WITH A COMBINATION VENT/OVERFILL ALARM IN PLACE OF THE NORMAL VENT. SET WHISTLE TO START AT 85% OF TANK CAPACITY.
11. LADDER, HANDRAILS, AND CATWALK MUST MEET ALL APPLICABLE OSHA AND UL142 STANDARDS AND SHALL BE BOLT–ON UNITS COATED WITH A HOT DIP ZINC GALVANIZE.
12. NORMAL VENT MUST BE MINIMUM OF 12 FEET ABOVE ADJACENT FINISH GRADE.
13. THIS DRAWING IS A PROTOTYPICAL TANK DRAWING. CONTRACTOR SHALL MOVE FILL AND ISSUE BUNG LOCATIONS TO MATCH EACH TANK'S PIPING LOCATION REQUIREMENTS.
14. TANK SHALL BE PAINTED PER CONTRACT DOCUMENTS.



3 C5.02 END VIEW

SCALE: NOT TO SCALE

REVISIONS

MARK	DATE	DESCRIPTION

NOT FOR CONSTRUCTION

HDL ENGINEERING Consultants LLC
civil - geotechnical - surveying - environmental - material testing
ANCHORAGE 907.564.2120
MAT-SU 907.746.5230
3335 Arctic Boulevard, Suite 100 Anchorage, AK 99503
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ALASKA ENERGY AUTHORITY

SCAMMON BAY BULK FUEL UPGRADES

ALASKA ENERGY AUTHORITY

SCAMMON BAY, ALASKA

SHEET TITLE
12,000 GALLON SINGLE WALL DUAL PRODUCT DISPENSING TANK

SHEET
C5.02

DRAWN BY:	CHECKED BY:
KK	DC
DATE: 09/30/20	SCALE: NONE
JOB NUMBER: 20–017	

LAYOUT C5.02

DATE, TIME 10/2/2020 4:21 PM

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APPENDIX D

Geotechnical Engineering Report

OCTOBER 2020

GEOTECHNICAL ENGINEERING REPORT

SCAMMON BAY BULK FUEL UPGRADES

2020

ALASKA ENERGY AUTHORITY

Prepared For:

ALASKA ENERGY AUTHORITY
813 WEST NORTHERN LIGHTS BLVD.
ANCHORAGE, AK 99503

HDL ENGINEERING Consultants LLC

Prepared By:

HDL ENGINEERING CONSULTANTS, LLC
3335 ARCTIC BLVD.
ANCHORAGE, AK 99503
PHONE 907.564.2120
FAX 907.564.2122

Geotechnical Engineering Report

for

Scammon Bay Bulk Fuel Upgrades
Scammon Bay, Alaska

Prepared for:

Alaska Energy Authority
813 West Northern Lights Blvd.
Anchorage, AK 99503

Prepared by:

Jacqueline LaBelle, EIT
Engineering Assistant

Reviewed by:
Doug P. Simon, PE
Geotechnical Services Manager

HDL Engineering Consultants, LLC
3335 Arctic Blvd., Ste. 100
Anchorage, AK 99503
Phone: 907.564.2120
Fax: 907.564.2122

November 2020

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TABLES

FIGURES

APPENDICES

ABBREVIATIONS

DOT&PF…….. Alaska Department of Transportation and Public Facilities

ASTM……ASTM International Standard

AASHTO……..American Association of State Highway Transportation Officials

ADEC……Alaska Department of Environmental Conservation

bgs……Below the existing ground surface

Client……...Alaska Energy Authority

F……Degrees Fahrenheit

HDL……HDL Engineering Consultants, LLC

IBC……..……International Building Code

NFS……..Non-frost susceptible

OSHA……Occupational Safety and Health Administration

psf……..……Pounds per square foot

psi……...Pounds per square inch

Report…..……..……..……Geotechnical Engineering Report

Site…….…… Scammon Bay, Alaska

USACE…….. United States Army Corps of Engineers

USCS……..……Unified Soil Classification System

USGS……United States Geological Survey

1.0 INTRODUCTION

In accordance with the request and authorization of Alaska Energy Authority (Client), HDL Engineering Consultants, LLC (HDL) conducted a geotechnical engineering evaluation of subsurface conditions in the community of Scammon Bay, Alaska (Site) to support bulk fuel system upgrades. The project consists of designing a new bulk fuel storage area including a truck fill dispenser, vehicle dispenser, and containment berms.

This Geotechnical Engineering Report (Report) provides the findings, conclusions, and recommendations that HDL derived from the geotechnical evaluation. This Report is subject to the limitations provided in Appendix A.

1.1 Purpose and Scope of Services

HDL's objectives for this project were to develop geotechnical engineering recommendations for site work, containment berm design, and tank foundations for the proposed tanks. To achieve our objectives, HDL:

- Advanced eleven (11) peat probes
- Completed four (4) hand augers
- Completed six (6) test pits
- Classified soil samples recovered from the hand augers and test pits based on visual observations and prepared boring logs
- Performed geotechnical engineering analyses and developed recommendations
- Prepared this Report, which summarizes HDL's findings from the geotechnical evaluation and provides geotechnical recommendations for the proposed project

1.2 Summary

This section provides a summary of the geotechnical findings and recommendations for the convenience of the non-technical reader. Read the summary in complete context with the remaining Report.

1. Test pits generally encountered an organic mat at the ground surface underlain by layers of sand with varying amounts of gravel, silt, organics, cobbles, boulders, and garbage. Hand augers were performed in the existing gravel cap over an old landfill area and encountered sand and gravel fill from the ground surface to the termination depth.

2. Soft soils were encountered at the peat probe locations and peat probe refusal was generally encountered between 0.3 feet and 1.8 feet below existing ground surface (bgs) with the exception of PP-09, which encountered refusal at a depth of 4.2 feet bgs.

3. Leveling Course placed less than 12 inches below the proposed foundation structures should consist of material passing the 3-inch sieve and meeting the Alaska Department of Transportation and Public Facilities (DOT&PF) Standard Specifications for Highway Construction, Section 703-2.07 for Selected Material Type A.

4. HDL recommends a concrete grade beam foundation system for the tanks. An allowable bearing capacity of 1,400 pounds per square foot (psf) may be used for design of foundations that bear a minimum of 0.5 feet below finished grade. Foundations should be constructed immediately after subgrade preparation to protect the soil bearing surface.

2.0 BACKGROUND

Scammon Bay, Alaska is located on the western coast of Alaska on the southern bank of the Kun River approximately 145 miles northwest of Bethel, Alaska. Figure 1 provides a map of the community location.

2.1 Existing Conditions

The site currently consists of a gravel pad covering an old landfill area and previously undeveloped land. Access to the existing gravel pad is from the road to the south. There are no existing structures or pavement on the site. There is garbage such as vehicles visibly protruding from the northern edge of the existing gravel pad.

2.2 Proposed Development

The proposed development generally consists of the following.

- Three (3) 27,000-gallon diesel bulk fuel tanks
- Four (4) 27,000-gallon gasoline bulk fuel tanks
- One (1) 12,000-gallon dual product dispensing tank
- On-grade secondary containment structure with gravel containment berms
- Dual product vehicle dispenser with concrete pad
- Dual product truck fill dispenser with concrete pad
- Distribution piping for truck fill and vehicle dispensers
- Retail sales building

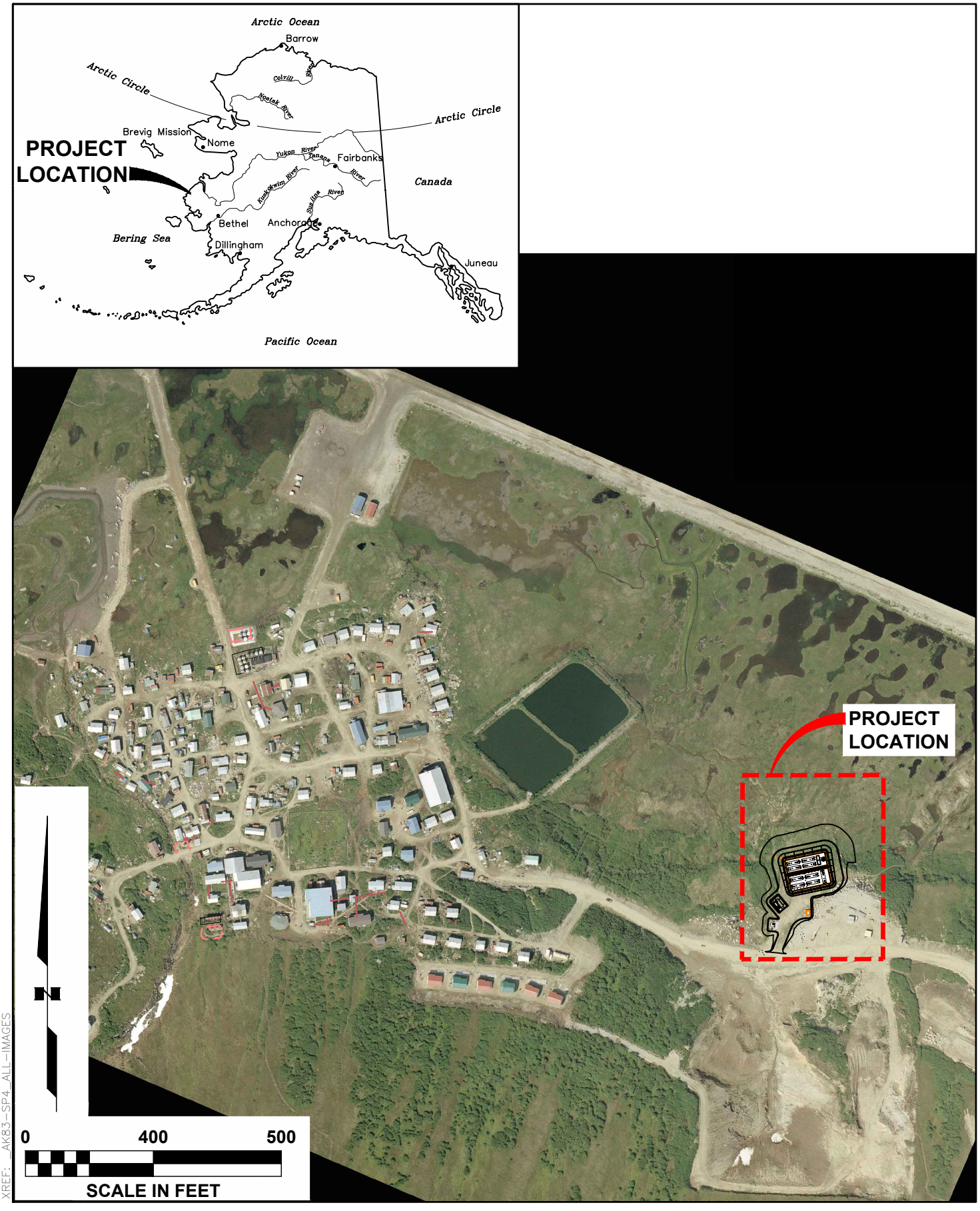
The new tank farm will be constructed on an approximately 200-foot-wide by 200-foot-long gravel pad partially overlapping the old landfill area.

3.0 SETTING

The following sections provide information about the geologic and climatic setting for the Site.

3.1 General Geology

The project area is located within the Yukon-Kuskokwim coastal lowland section within the Bering shelf, which lies on the western coast of Alaska and joins with the Chukotsk Peninsula of Siberia. Relatively flat topography rising from 100 feet to 300 feet above sea level dotted with numerous lakes and rivers, as well as extensive areas of marsh characterize the Yukon-Kuskokwim coastal lowland section. The western portion also contains low hills and a few volcanic craters and mountains rising to approximately 2,450 feet above sea level. The subsurface generally consists of Quaternary sand and silt to an unknown depth. Cretaceous sedimentary rocks with early Tertiary intrusions characterize the hills. Basalt flows and cinder cones are also present in the



H:\jobs\19-116 ANC 549 Fireweed (Big City)\CAD\Drawings\20-017_04 SCAMMON BAY GEOTECH-FIG-1, 1=1, 10/26/20 at 16:08 by jkk
LAYOUT: FIGURE 1
XREF: _AK83-SP4_ALL-IMAGES

Figure 1
VICINITY MAP
SCAMMON BAY BULK FUEL UPGRADES
SCAMMON BAY, AK

section. There are no glaciers in the area; however, discontinuous permafrost is present (Wahrhaftig, 1965).

Scammon Bay is located in a region of low seismicity. Based on the United States Geologic Survey (USGS) earthquake catalog, there were no events above Richter Magnitude 5.0 within 100 miles of the Site from 1898 through 2020.

3.2 Climatology

Scammon Bay is characterized by a subarctic climate with generally long, cold winters and short mild summers. Climate data was taken from the weather station in Cape Romanzof, Alaska, approximately 15.5 miles southwest of Scammon Bay. The average temperatures range from a low of 8.3 Fahrenheit (F) to a high of 18.3 F in January and a low of 45.1 F to a high of 53.0 F in July. Average annual precipitation is approximately 25 inches per year with a total annual snowfall of approximately 68 inches (Western Regional Climate Center, 2020).

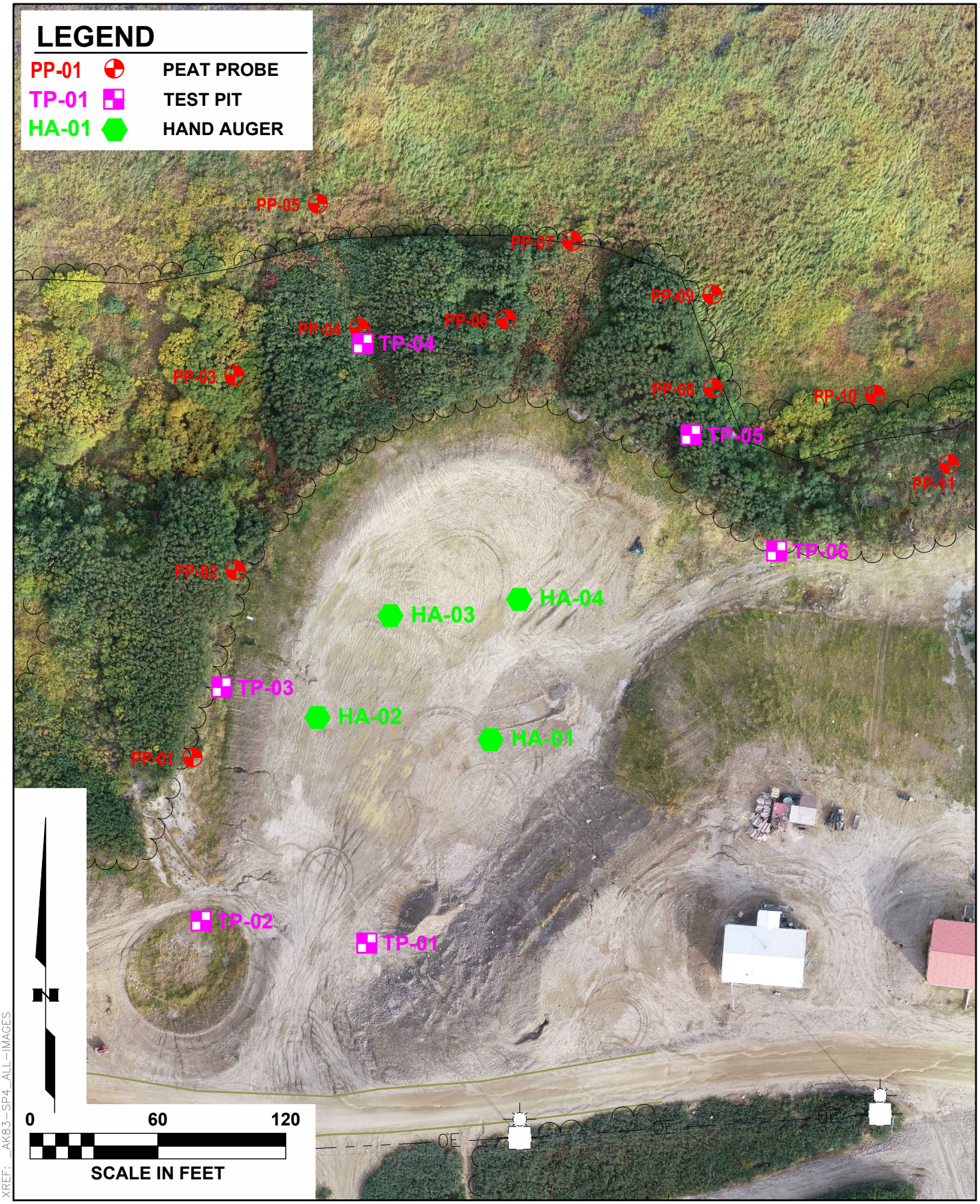
4.0 SUBSURFACE EVALUATION

HDL performed a subsurface evaluation in Scammon Bay between September 22, 2020 and September 24, 2020 to evaluate the shallow subsurface conditions. The subsurface evaluation consisted of eleven (11) peat probes, four (4) hand augers, and six (6) test pits. An experienced engineering assistant was present during drilling to locate the test holes, log subsurface conditions, and observe groundwater depths, where encountered.

HDL advanced eleven (11) peat probes, designated PP-01 through PP-11, to a maximum depth of 4.2 feet bgs. The peat probe is a 7/8-inch diameter, multi-sectioned, steel soil probe with a “T” handle that is pushed manually until reasonable exertion will no longer advance the rods. HDL advanced four (4) hand augers, designated HA-01 through HA-04, to a maximum depth of 2.5 feet bgs using a 3-inch diameter hand auger and a post hole digger. HDL completed six (6) test pits, designated TP-01 through TP-06, to a maximum depth of 11.5 feet bgs with a Case CX80C excavator with the assistance of a local operator. HDL also recovered a sample of the quarry wall material at the local material source.

HDL described the recovered soils in the field in accordance with ASTM International Standard (ASTM) D2488. HDL assigned frost design classifications, as appropriate, in general accordance with the Frost Design Soil Classification provided in Appendix B using the DOT&PF methodology. Descriptions for organic soils were in general accordance with the Peat, Organic Soil Classification System presented in Appendix B. The hand auger and test pit logs are included in Appendix C.

HDL performed the fieldwork in general accordance with the procedures outlined in the DOT&PF “Alaska Geotechnical Procedures Manual”. We located the explorations in the field using a recreational grade GPS. Figure 2 shows the approximate peat probe, hand auger, test pit locations.



H:\jobs\19-116 ANC 549 Fireweed (Big City)\CAD\Drawings\19-116 ANC 549 Fireweed, 1=1, 08-19-19 at 16:08 by jkk
LAYOUT: FIGURE 2
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Figure 2
EXPLORATION LOCATION MAP
SCAMMON BAY BULK FUEL UPGRADES
SCAMMON BAY, AK

5.0 LABORATORY TESTING

HDL conducted laboratory testing of the soil samples at our re:Source (formerly AMRL) accredited and United States Army Corps of Engineers (USACE) validated laboratory. These tests verified or modified the field classifications and provided additional data to support the geologic interpretation. HDL conducted the following tests on select samples.

- Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass (ASTM D2216)
- Particle-Size Analysis of Soils (ASTM D422)
- Particle-Size Distribution (Gradation) of Fine-Grained Soils Using Sedimentation (ASTM D7928)

One (1) soil sample was selected for chemical analyses to measure pH, resistivity, chloride and sulfate content. Chemical analyses were performed by SGS North America, Inc. and were performed in accordance with United States Environmental Protection Agency methods SW9045D, SM19, 2510A, and SW9056A, respectively.

The boring logs and grain size distribution curves provided in Appendix C present the results of the laboratory testing. Results of the chemical analyses are provided in Appendix D.

6.0 SUBSURFACE CONDITIONS

In general, hand augers over the old landfill area encountered sand and gravel fill. The subsurface conditions encountered in the test pits generally consisted of a thin organic mat overlying sand with varying amounts of silt, gravel, organics, cobbles, boulders, and occasional garbage. The following sections summarize the subsurface conditions encountered and the logs presented in Appendix C provide detailed information. Figure 3 provides a summary of the measured moisture contents.

6.1 Organic Mat

Peat probes PP-01 through PP-08, PP-10, and PP-11 encountered refusal at depths ranging from 0.3 feet to 1.8 feet bgs. Peat probe PP-09 encountered refusal at a depth of approximately 4.2 feet bgs. Peat Probe refusal depths can be seen below in Table 1. Hand augers were performed in the gravel fill covering the old community landfill site and did not encounter an organic mat. Test pits TP-02 through TP-06 encountered an organic mat at the surface that ranged from 0.2 feet to 0.6 feet thick. Detailed information may be found on the logs presented in Appendix C.

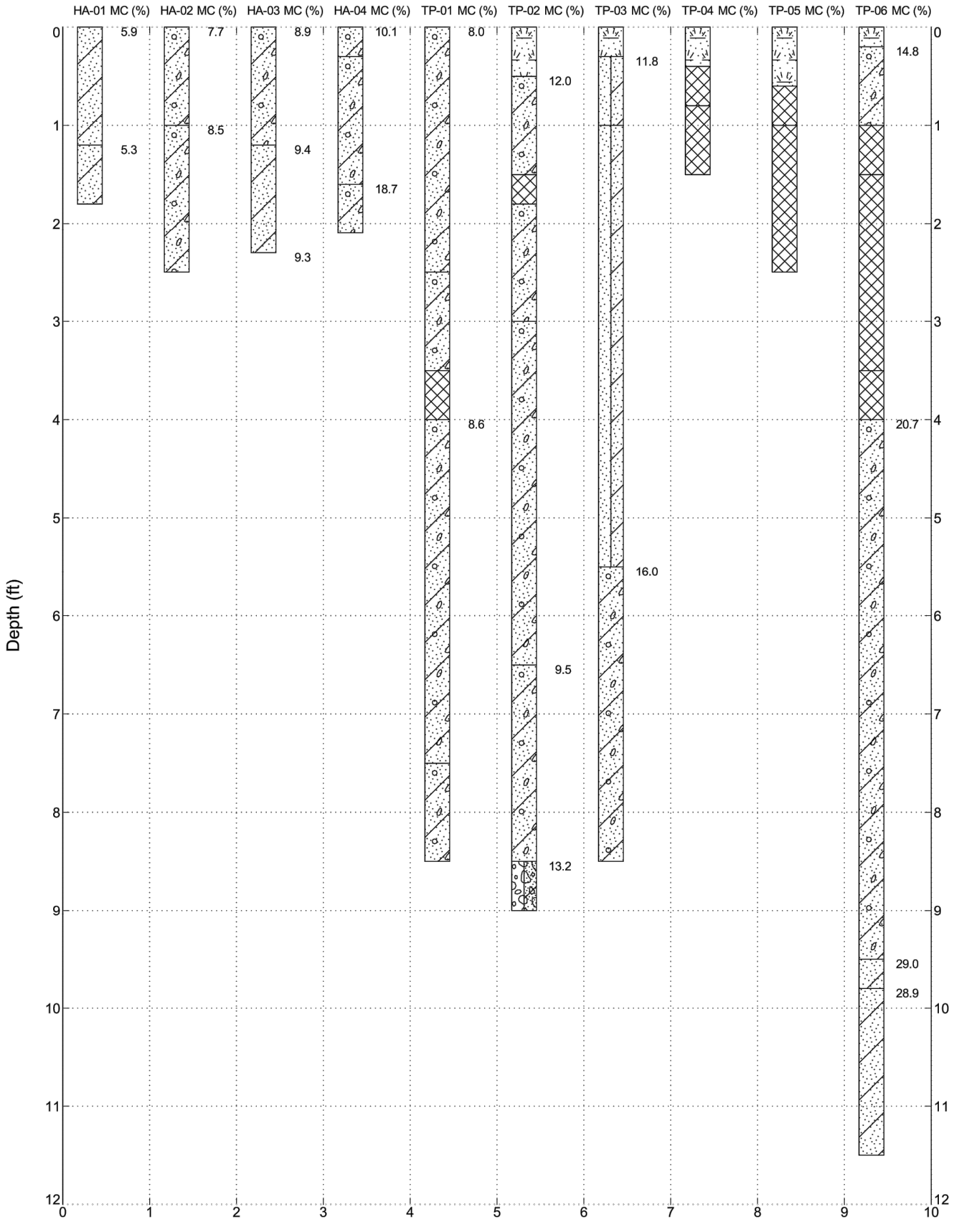


Figure 3
MOISTURE CONTENT SUMMARY
SCAMMON BAY BULK FUEL UPGRADES
SCAMMON BAY, AK

Table 1 –Peat Probe Refusal Depths

Peat Probe Number	Refusal Depth (feet)
PP-01	0.5
PP-02	0.8
PP-03	1.0
PP-04	0.3
PP-05	1.8
PP-06	0.4
PP-07	0.8
PP-08	0.8
PP-09	4.1
PP-10	1.7
PP-11	1.6

6.2 Sand

Poorly graded sand was encountered at the surface in TP-01 and HA-01 through HA-04 and beneath the organic mat in TP-02 through TP-06. The sand layers included varying amounts of gravel, silt, organics, cobbles, boulders, and garbage and generally extended to the termination depth. Based on a sample from TP-01, the measured pH was 6.70, chloride content was 0.00 mg/kg, sulfate content was 4.55 mg/kg, and the resistivity was 254 ohm-m. Table 2 summarizes the laboratory results for this stratum.

Table 2 –Sand Laboratory Results Summary

Test Hole	Depth	Grain Size Distribution		
	(ft)	% Gr	%Sa	%P200
TP-01	0.0	16.8	64.4	18.8
TP-02	0.5	33.3	50.3	16.4
TP-02	6.5	19.5	65.0	15.5
TP-03	0.3	4.1	84.7	11.2
TP-03	5.5	30.9	55.2	13.9
TP-06	0.2	17.1	57.4	25.5
TP-06	4.0	25.0	40.0	35.0
TP-06	9.8	5.3	47.0	47.7
HA-02	0.0	17.2	67.4	15.4
HA-03	0.0	15.6	67.9	16.5
HA-03	1.2	7.5	73.3	19.2
HA-04	0.0	23.2	59.7	17.1

-- Not Tested

6.3 Garbage

Garbage was encountered in test pits TP-01, TP-02, and TP-04 through TP-06 at depths ranging from 0.8 feet to 3.5 feet bgs. The garbage ranged in thickness from 0.3 feet to 3.0 feet in TP-01, TP-02, and TP-06. Garbage extended to the test pit termination depth in TP-04 and TP-05. Garbage consisted mostly of soil mixed with household waste including plastic bags, food wrappers, aluminum cans, etc. Test pits TP-04 and TP-05 encountered garbage that included large metal pieces and car parts.

6.4 Groundwater

Free groundwater was not encountered in the hand augers, but was encountered in test pits TP-02 through TP-04 at depths ranging from 1.5 feet to 8.5 feet bgs. Groundwater levels at the Site may fluctuate depending on the season, temperature, and precipitation. Groundwater levels during construction may be higher or lower than those encountered.

7.0 ENGINEERING ANALYSIS AND RECOMMENDATIONS

There are several components to the geotechnical analysis and recommendations. These include site preparation, seismic considerations, settlement, frost susceptibility, and construction considerations. The following sections provide geotechnical recommendations for site work and foundations.

7.1 Site Work

The following sections provide a summary of geotechnical considerations for the Site development.

7.1.1 Site Preparation

HDL recommends the undisturbed portions of the Site be cleared and grubbed prior to the onset of construction. If soft or unstable soils or other deleterious materials are encountered during construction, the materials should be removed and replaced with compacted Fill. We recommend that the exposed subgrade be proof-rolled to provide a level, firm, uniform surface prior to the placement of Fill.

The bottom of all excavations should be compacted to a density of at least 95 percent of the maximum density as determined by the Modified Proctor compaction procedure (ASTM D1557). Excavations should be dewatered and protected from adjacent runoff. The subgrade soils may become difficult to compact if they are exposed to additional rainfall or runoff.

Fill placed less than 12 inches below the proposed footings should be low- to non-frost susceptible (F1 to NFS) gravel or non-frost susceptible sand (NFS) meeting the requirements for Selected Material, Type A. The onsite soils generally do not meet these requirements.

In areas of the proposed project where existing grade needs to be raised, fill meeting the requirements of Selected Material, Type B should be used. Fill meeting the requirements

described in this report should support a side slope of 2:1 around the gravel pad. Erosion control measures such as seeding should be incorporated to protect the side slopes from undue erosion.

Sliver fills should be should be benched into the existing slope. The bench should be as wide as needed to support compaction equipment and should tie a minimum of 2 feet into the existing slope. The edges of the embankment should be constructed with slopes that have a horizontal to vertical relationship of 2 to 1 (2H:1V) or flatter.

Areas used for vehicle traffic including fuel trucks should be surfaced with a minimum of 8 inches aggregate meeting requirements for Surface Course, E-1 as described in Section 7.1.2.

Fill should be placed in lifts not to exceed 10 to 12 inches loose thickness, and compacted to a density of at least 95 percent of the maximum dry density as determined by ASTM D1557. During fill placement, we also recommend that large cobbles or boulders with dimensions in excess of 2/3 the lift thickness be removed.

7.1.2 Aggregate Materials

The Fill should be a reasonably well graded mineral soil meeting the requirements of DOT&PF Standard Specifications for Highway Construction, Section 703-2.07 for Selected Material, Type B. The driving surface of the proposed project should consist of material meeting the DOT&PF Standard Specifications for Highway Construction, Section 703 for Surface Course, Gradation E-1. The Bedding Material and Leveling Course should consist of material passing the 3-inch sieve and meeting the DOT&PF Standard Specifications for Highway Construction, Section 703-2.07 for Selected Material, Type A. Aggregate gradation requirements are detailed in Table 3.

The drain rock material placed over the geogrid should consist of rounded or sub-rounded, clean, uniform, gravel. Table 3 details gradation requirements for the drain rock. Production of drain rock from the local material source would require significant processing and produce significant waste material. Local material is likely not practical for use as a drainage rock material.

The aggregate materials should not contain muck, frozen material, roots, sod or other deleterious matter, and not have a PI greater than six (6) percent.

Table 3 – Aggregate Material Specifications

Sieve	Material			
	Fill	Bedding Material & Leveling Course	Surface Course, E-1	Drain Rock Material
3”	-	100	-	-
1”	-	-	100	100
3/4”	-	-	70-100	90-100
1/2”	-	-	-	50-70
3/8”	-	-	50-85	20-50
No. 4	-	20-60	35-65	0-10
No. 8	-	-	20-50	-
No. 50	-	-	15-30	-
No. 200	0-10	0-6	8-15	0-1

7.2 Concrete Pad

HDL understands that reinforced concrete pads will be constructed for the proposed dual product truck fill and dual product vehicle dispenser. We assume that the subgrade below the structural section will be firm and unyielding. The minimum recommended structural section for the concrete pads are as follows:

6 inches – Reinforced Concrete
30 inches – Selected Material, Type A

The recommended structural section does not provide full frost protection and seasonal movement of the concrete should be expected. This movement may reduce the life of the concrete. The life of the concrete can be increased by increasing the thickness of the structural section.

7.3 Seismic Analysis

The project area is generally in an area of low seismicity. Based on the subsurface conditions encountered, it is our opinion that seismic Site Class “D” as defined in the International Building Code (IBC) is appropriate for the Site. The maximum considered earthquake ground motion spectral response accelerations for short period and for one-second peaks were obtained utilizing the Seismic Design Maps created by Structural Engineers Association of California and California’s Office of Statewide Health Planning and Development. Seismic Design Maps is a web interface that uses USGS web services to retrieve seismic design data; results of which are summarized in Table 4.

Table 4 – Seismic Design Criteria

IBC 2015 Seismic Design Criteria	Value
Spectral Response at Short Periods, S_S	0.215
Spectral Response at 1-Second Period, S_1	0.090
Site Class	D
Site Coefficient F_a	1.600
Site Coefficient F_v	2.400
Site Adjusted Spectral Response at Short Periods, S_{MS}	0.344
Site Adjusted Spectral Response at 1-second Periods, S_{M1}	0.216

7.4 Foundations

Design of a structure's foundation must consider the bearing capacity of the supporting soils, the effects of seasonal frost action, and the expected total and differential settlements. The foundation system must also consider the risk of failure and the cost of construction.

Assuming the proposed fuel tanks will meet the assumptions outlined in this report, we recommend a shallow grade beam foundation system that is continuous and reinforced along the length of the tanks. Foundations should be embedded a minimum of 0.5 feet below finished grade and be a minimum of 18 inches wide for the entire length of the tank.

Foundations should be constructed immediately after subgrade preparation to protect the soil bearing surface. In addition, foundation excavations should be backfilled as soon as possible after foundation construction.

7.4.1 Allowable Bearing Pressures

The proposed fuel tank foundations will bear upon compacted drain rock material. If the soils beneath the proposed foundations are consistent with the requirements provided in this report, an allowable soil bearing capacity of 1,400 psf may be used for design of foundations that bear a minimum of 0.5 feet below finished grade. The above bearing values may be increased by one-third for seismic or wind loading conditions.

7.4.2 Settlement

The total settlements that will develop are dependent upon the actual loads that are applied, the dimensions of the foundations, the density of the supporting soil, and the care with which fills are placed and compacted. We anticipate properly placed and compacted fill placed on previously undisturbed ground will not experience significant settlement. The settlement that does occur will largely be elastic in nature and occur during construction. The old landfill area has the greatest potential for settlement. Based on the reported performance of the existing pad, it appears that settlement would be isolated to smaller pockets, about the size of a car. The grade beams should be designed to bridge over areas of isolated settlement up to 10 feet in diameter. Grade changes should be kept to less than 1 foot to reduce the potential for settlement.

7.5 Gravel Containment Berms

The gravel containment berms for the proposed tank farm should consist of a section of Fill underlain by geogrid and stabilized using lean mix concrete or hard armor concrete blocks. A layer of geogrid should be placed over the existing ground surface prior to the placement of the fill to reduce the potential for differential settlement along the crest. The geogrid should meet the requirements of DOT&PF Standard Specifications for Highway Construction, Section 729-2.04 for Geogrid for Embankment and Roadway Stabilization and Reinforcement.

If lean mix concrete is used to stabilize the berm surface, the gravel containment berm should be covered in 3 inches of lean mix concrete with a minimum compressive strength of 750 pounds per square inch (psi). The concrete will be subject to spalling and cracking due to seasonal movement and frost action.

If hard armor concrete blocks are used for stabilization of the berms, Contech Armorflex articulating concrete blocks should be used. The block should be an open cell block of the class 30-S or approved equivalent.

7.6 Pipe Support Foundations

The distribution piping between the bulk and dispensing tanks will be above-ground as much as the site allows. The above-ground pipes will be supported by braces founded on shallow cast-in-place concrete piers placed on 12 inches of Leveling Course. These braces will be located approximately every 10 feet along the above-ground section of piping. We assume the pipes will be no more than 2 feet above finished grade.

Assuming subsurface conditions along the underground piping sections are similar to those encountered in the test pits, the pipes will be located in sand and gravel with cobbles and boulders. The pipe should be bedded on 3 inches of Bedding Material to protect it from potential damage due to the cobbles and boulders. The pipe should be set in a trench that is a minimum of 2.0 feet bgs. A minimum of 12 inches of Bedding Material should be backfilled over the underground piping. The remainder of the trench can be backfilled using Fill. The Fill and Bedding Materials should meet the requirements described in Section 7.1.2.

7.7 Corrosion Potential

Based on the results of chemical testing, the soils do not appear to be corrosive. We recommend additional analysis by a corrosion engineer if corrosion is a critical design element.

7.8 Frost Susceptibility

Scammon Bay is in a region of moderate freeze and thaw cycles. Highly frost susceptible (F3) soils were encountered within the shallow subsurface at the Site. Leaving the highly frost susceptible soils in place increases the risk of frost related issues. Removing and replacing the highly frost susceptible soils reduces the risk of frost related issues.

7.9 Local Availability of Construction Materials

HDL performed laboratory testing on a sample of the quarry material from the local material source, designated MS-01. The results of the laboratory testing indicate the local material source is capable of producing the Fill recommended in this report. Based on laboratory testing performed on the quarry wall materials, the local material source may be able to meet the requirements for Surface Course and Leveling Course/Bedding Material; however, some processing of the material will likely be required including screening of oversized material. Drainage rock will likely need to be imported. The laboratory testing for the material source sample is presented in Appendix C.

7.10 Drainage

Groundwater was encountered in the test pits at depths ranging from 1.5 feet to 8.5 feet bgs. Based on the hand augers and test pits conducted, groundwater is not likely to be encountered during typical pipe construction on the existing and proposed gravel pad. Dewatering may not be necessary, but the groundwater level will likely vary from that encountered during digging. If groundwater is present in excavations, the soils will be prone to collapse and construction may be difficult.

HDL recommends the site be graded to promote positive drainage away from the structures and compaction of the near surface soils to reduce permeability.

7.11 Construction Considerations

If temporary excavations will be needed to support the pipe construction, we recommend that the trench side slopes, trench bottom conditions, and dewatering efforts be made the responsibility of the contractor. The contractor he is present on a day to day basis and can adjust his efforts to obtain the needed stability and meet the applicable Alaska and Federal Occupational Safety and Health Administration (OSHA) safety regulations. Deviation from the OSHA stipulations requires the approval of a licensed Professional Geotechnical Engineer.

The need for dewatering will depend on the time of year for construction and the depth of the trench. Surface water should be directed away from the excavations. Heavy precipitation may cause soils to become saturated and less stable. The contractor should phase construction to minimize exposure of subgrade soils.

For management of garbage during construction activities, refer to the Alaska Department of Environmental Conservation (ADEC) guidelines under AAC Title 8, Chapter 60.

8.0 REFERENCES

Wahrhaftig. 1965. *Physiographic divisions of Alaska.* USGS. October 6, 2020. https://pubs.er.usgs.gov/publication/pp482.

Western Regional Climate Center (WRCC). 2020. Cape Romanzof, Alaska (501318). October 6th, 2020. https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ak1318

9.0 CLOSURE

This Report has been prepared at the request and authorization of Alaska Energy Authority and is subject to the Limitations provided in Appendix A. Please feel free to contact Doug Simon at dsimon@hdlalaska.com or (907)564-2120 for questions or clarifications.

Prepared by:
HDL Engineering Consultants, LLC

Jacqueline LaBelle, EIT
Engineering Assistant

Reviewed By:
HDL Engineering Consultants, LLC

Doug P. Simon, P.E.
Geotechnical Services Manager

AE CL 861

STATE OF ALASKA
49TH
11/10/10
DOUGLAS P. SIMON
CE-13943
REGISTERED PROFESSIONAL ENGINEER

APPENDIX A

Limitations (2 pages)

GEOTECHNICAL LIMITATIONS

Use of Report

1. HDL Engineering Consultants, LLC (HDL) prepared this report on behalf of, and for the exclusive use of our Client for the stated purpose(s) and location(s) identified in the Proposal for Services and/or Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to HDL.

2. If substantial time has elapsed between submission of this report and the start of work at the site, or if conditions have changed because of natural causes or construction operations at or adjacent to the site, we recommend that HDL be retained to review this report to determine the applicability of the conclusions considering the time lapse or changed conditions.

Standard of Care

3. HDL's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and/or Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location(s), or the design has been altered in any way, HDL shall be so notified and afforded the opportunity to revise the report, as appropriate, to reflect the unanticipated changed conditions.

4. HDL's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

5. The generalized soil profile(s) provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

6. Unanticipated soil conditions are commonly encountered and cannot be fully determined by merely taking soil samples or advancing borings. Such unexpected conditions frequently require additional expenditure to attain a properly constructed project. Therefore, some contingency fund is recommended to accommodate such potential extra costs.

7. In preparing this report, HDL relied on certain information provided by the Client, state

and local officials, and other parties referenced therein which were made available to HDL at the time of our evaluation. HDL did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

8. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water encountered in the course of the work may differ from that indicated in the Report.

9. HDL's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

10. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

11. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Additional Services

12. HDL recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B

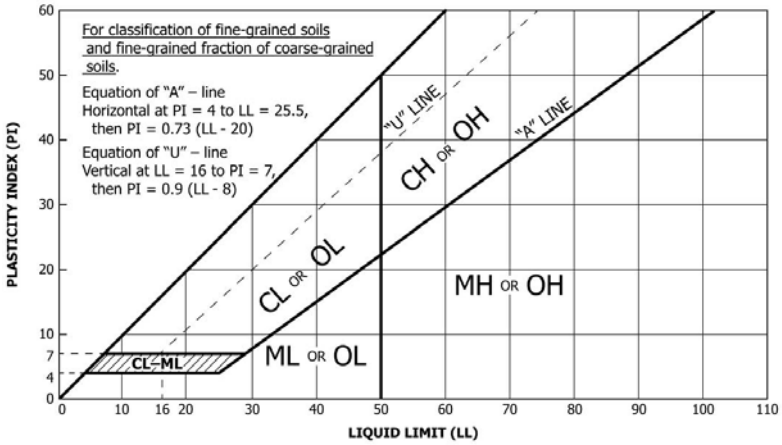
Boring Log Key (1 page)
Frost Design Classification System (1 page)
Peat and Organic Soil Classification System (1 page)

BORING LOG KEY

Summary of the Unified Soil Classification System (from ASTM International Standard D2487)[A]				Soil Classification	
				Group Symbol	Group Name[B]
Coarse-grained Soils (*More than 50% retained on No. 200 sieve*)	Gravels (*More than 50% of coarse fraction retained on No. 4 sieve*)	Gravels with < 5% fines[C]	$C_u \geq 4$ and $1 \leq C_c \leq 3$[D]	GW	Well-graded gravel[E]
			$C_u < 4$ and/or [$C_c < 1$ or $C_c > 3$][D]	GP	Poorly graded gravel[E]
		Gravels with > 12% fines[C]	Fines classify as ML or MH	GM	Silty gravel[E,F,G]
			Fines classify as CL or CH	GC	Clayey gravel[E,F,G]
	Sands (*50% or more of coarse fraction passes No. 4 sieve*)	Sands with < 5% fines[H]	$C_u \geq 6$ and $1 \leq C_c \leq 3$[D]	SW	Well-graded sand[I]
			$C_u < 6$ and/or [$C_c < 1$ or $C_c > 3$][D]	SP	Poorly graded sand[I]
		Sands with > 12% fines[H]	Fines classify as ML or MH	SM	Silty sand[F,G,I]
			Fines classify as CL or CH	SC	Clayey sand[F,G,I]
Fine-grained Soils (*More than 50% passes the No. 200 sieve*)	Silts and Clays (*LL<50*)	Inorganic	PI>7 and plots on or above "A" line[J]	CL	Lean clay[K,L,M]
			PI<4 or plots below "A" line[J]	ML	Silt[K,L,M]
		Organic	LL - Oven dried/LL - Not dried <0.75	OL	Organic clay/silt[K,L,M,N/O]
	Silts and Clays (*LL≥50*)	Inorganic	PI plots on or above "A" line	CH	Fat clay[K,L,M]
			PI plots below "A" line	MH	Elastic silt[K,L,M]
		Organic	LL - Oven dried/LL - Not dried <0.75	OH	Organic clay/silt[K,L,M,P/Q]
Highly Organic Soils	Primarily organic matter, dark in color, and organic odor			PT	Peat

NOTES:
Visual soil descriptions performed in accordance with ASTM D2488
Lowercase USCS abbreviation indicates field classification
Uppercase USCS abbreviation indicates laboratory classification

[A]Based on the material passing the 3-in. (75-mm) sieve
[B]If field sample contained cobble or boulders, or both, add "with cobbles or boulders, or both" to group name
[C]Gravels with 5 to 12% fines require dual symbols:
GW-GM well-graded gravel with silt
GW-GC Well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
[D] $C_u = D_{60}/D_{10}$, $C_c = (D_{30})^2/(D_{10} \times D_{60})$
[E]If soil contains ≥ 15% sand, add "with sand" to group name
[F]If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM
[G]If fines are organic, add "with organic fines" to group name
[H]Sands with 5 to 12% fines require dual symbols:
SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
[I]If soil contains ≥15% gravel, add "with gravel" to group name
[J]If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay
[K]If soil contains 15 to < 30% plus No. 200, add "with sand" or "with gravel", whichever is predominant
[L]If soil contains ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name
[M]If soil contains ≥ 30% plus No. 200, predominatly gravel, add "gravelly" to group name
[N]PI ≥ 4 and plots on or above "A" line
[O]PI < 4 or plots below "A" line
[P]PI plots on or above "A" line
[Q]PI plots below "A" line



GRAIN SIZE		
Size Class	Inches	mm
Boulders	>12 inches	>300
Cobbles	3 to 12	75 - 300
Gravel		
Coarse	3/4 - 3	19.0 - 75
Fine	3/16 - 3/4	4.76 - 19.0
Sand		
Coarse	1/16 - 3/16	2.0 - 4.76
Medium	1/64 - 1/16	0.42 - 2.0
Fine	1/256 - 1/64	0.074 - 0.42
Silt and Clay	<1/256	<0.074

SAMPLE TYPES	
Symbol	Description
SS	Split Spoon
MSS	Modified Split Spoon
G	Grab
ST	Shelby Tube
GP	Push Sample
C	Core

SOIL CONSISTENCY		
Description	N-Value	Pocket Pen.
Very Soft	<2	<0.25
Soft	2 - 4	0.25 - 0.5
Medium	4 - 8	0.5 - 1.0
Stiff	8 - 15	1.0 - 2.0
Very Stiff	15 - 30	2.0 - 4.0
Hard	>30	>4.0

RELATIVE SOIL DENSITY	
Description	N-Value
Very Loose	0 - 4
Loose	5 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	>50

COMPONENT PROPORTION (Visual)	
Term	Range
Trace	0 - 5%
Little	5 - 15%
Some	15 - 30%
And	30 - 50%

FROST DESIGN SOIL CLASSIFICATION

US Army Corps of Engineers (USACE) Methodology

The following frost design soil classification was developed by the USACE for describing the potential frost susceptibility of soils. The standard is published in USACE, EM 1110-3-138, "Pavement Criteria for Seasonal Frost Conditions," April 1984.

FROST GROUP	GENERAL SOIL TYPE	% FINER THAN 0.02 mm BY WEIGHT	TYPICAL USCS SOIL CLASS
NFS(1)	(a) Gravels Crushed Stone Crushed Rock	0-1.5	GW, GP
	(b) Sands	0-3	SW, SP
PFS(2)	(a) Gravels Crushed Stone Crushed Rock	1.5 -3	GW, GP
	(b) Sands	3-10	SW, SP
S1	Gravelly Soils	3-6	GW, GP, GW-GM, GP-GM, GW-GC, GP-GC
S2	Sandy Soils	3-6	SW, SP, SW-SM, SP-SM, SW-SC, SP-SC
F1	Gravelly Soils	6-10	GM, GC, GW-GM, GP-GM, GW-GC, GP-GC
F2	(a) Gravelly Soils	10-20	GW, GP, GW-GM, GP-GM, GW-GC, GP-GC
	(b) Sands	6-15	SM, SW-SM, SP-SM, SC, SW-SC, SP-SC, SM-SC
F3	(a) Gravelly Soils	Over 20	GM, GC, GM-GC
	(b) Sands, except very fine silty sands	Over 15	SM, SC, SM-SC
	(c) Clays, PI>12	--	CL, CH
F4	(a) Silts	--	ML, MH, ML-CL
	(b) Very fine silty sands	Over 15	SM, SC, SM-SC
	(c) Clays, PI<12	--	CL, ML-CL
	(d) Varied clays or other fine-grained banded sediments	--	CL or CH layered with ML, MH, ML-CL, SM, SC, or SM-SC

(1) Non-frost susceptible

(2) Possibly frost susceptible, requires lab test for void ratio to determine frost design soil classificatIon. Gravel with void ratio > 0.25 would be NFS; Gravel with void ratio < 0.25 would be S1; Sands with void ratio > 0.30 would be NFS; Sands with void ratio < 0.30 would be S2 or F2

Alaska Department of Transportation and Public Facilities (DOT&PF) Methodology

As shown above, the USACE standard is based in part on the percentage of material finer than 0.02 mm ($P_{0.02}$). The DOT&PF modifies the USACE standard by referencing the percentage of material finer than the #200 sieve, which is 0.075 mm, (P_{200}) rather than 0.02 mm. As reported in the Alaska Flexible Pavement Guide, the P_{200} value is typically twice that of the $P_{0.02}$; therefore, DOT&PF considers material with less than 6% by weight passing the #200, non-frost susceptible (NFS).

Municipality of Anchorage (MOA) Methodology

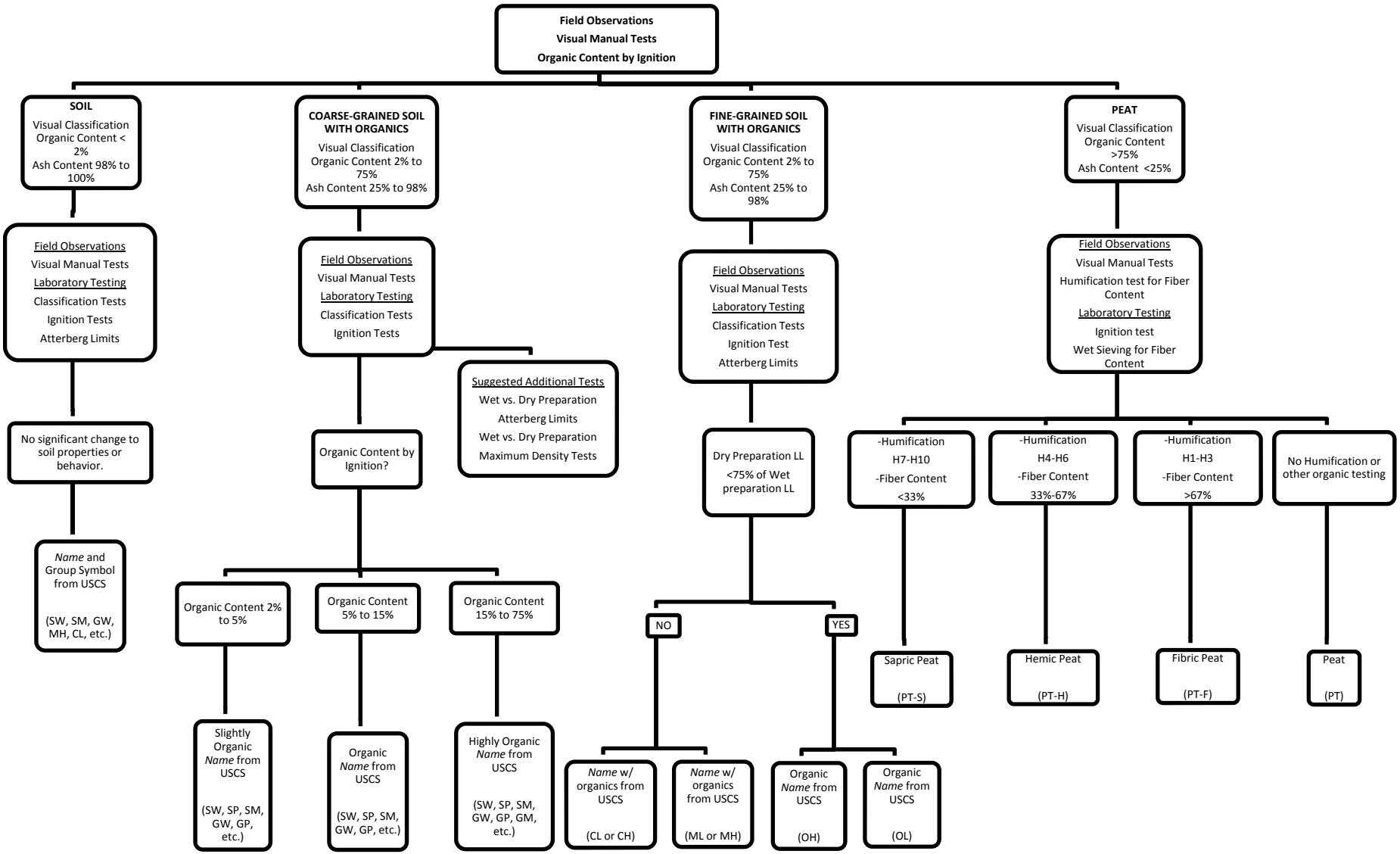
The MOA uses a simplified method based on the USACE methodology noted above. The MOA method is detailed in the Design Criteria Manual and summarized below. Note that the MOA method uses the $P_{0.02}$ value rather than the P_{200} value.

FROST GROUP	SOIL TYPE	PERCENTAGE FINER THAN 0.02 MILLIMETER BY WEIGHT	TYPICAL SOIL TYPES UNDER UNIFIED SOIL CLASSIFICATION SYSTEM
NFS	a. Gravels	0 to 3	GW, GP
	b. Sands	0 to 3	SW, SP
F-1	Gravelly soils	3 to 10	GW, GP, GW-GM, GP-GM
F-2	a. Gravelly soils	10 to 20	GM, GW-GM, GP-GM
	b. Sands	3 to 15	SW, SP, SM, SW-SM, SP
F-3	a. Gravelly soils	Over 20	GM, GC
	b. Sands, except very fine silty sands	Over 15	SM, SC
	c. Clays, PI>12	--	CL, CH
F-4	a. All silts	--	ML, MH
	b. Very fine silty sands	Over 15	SM, SC
	c. Clays, PI<12	--	CL, CL-ML
	d. Varied clays and other fine-grained, banded sediments	--	CL, CL-ML
		--	CL, CH, ML, SM

* Municipality of Anchorage, Project Management & Engineering Department, Design Criteria Manual, January 2007.

PEAT AND ORGANIC SOIL CLASSIFICATION SYSTEM

(Summarized from Alaska Guide for Classification of Peat and Organic Soil)



APPENDIX C

Hand Auger & Test Pit Logs (10 pages)
Grain Size Distribution Curves (3 pages)

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # HA-01

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Southeast quadrant of gravel pad*
Lat/Long: *61.84095/-165.57164*
Elevation:

Equipment Type: *Hand tools*
Drilling Method:
Field Crew:

Total Depth: *1.8 feet*
Date: *9/22/2020*
Geologist: *J.LaBelle*

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	Ground Water Data			SUBSURFACE MATERIAL	
									Depth in (ft.)				
									Time				
									Date				
									Symbol				
0	GRAB	S-1					sm					SAND, (sm); fine to coarse; some gravel, fine to coarse; little to some silt; brown, dry Moisture =5.9%	0.0
1	GRAB	S-2										large cobbles encountered; difficult digging Moisture =5.3%	1.2
								BOH 1.8				Notes: Terminated hand auger at approximately 1.8 feet bgs due to hand tool refusal on cobbles. No free water encountered.	1.8

A USCS LOG OF TEST HOLE 20-017 SCAMMON BAY BFU.GPJ HDL MODIFIED.GDT 10/15/20

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # HA-02

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Southwest quadrant of gravel pad*
Lat/Long: *61.84098/-165.57211*
Elevation:

Equipment Type: *Hand tools*
Drilling Method:
Field Crew:

Total Depth: *2.5 feet*
Date: *9/23/2020*
Geologist: *J.LaBelle*

Depth (Feet)	Sample Data: Sample Type	Sample Data: Number	Sample Data: Blow Count	Sample Data: Sample	Sample Data: Recovery	Sample Data: N-Value	USCS Classification Bonded Zone	Soil Graphic	Ground Water Data			SUBSURFACE MATERIAL	
									Depth in (ft.)				
									Time				
									Date				
									Symbol				
0	GRAB	S-1					sm					SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, F3	0.0
												P200 =15.4%, Sa =67.4%, Gr =17.2%, Moisture =7.7%	
1	GRAB	S-2										large cobbles encountered; difficult digging Moisture =8.5%	1.0
2													2.5
								BOH 2.5				Notes: Terminated hand auger at approximately 2.5 feet bgs due to hand tool refusal on cobbles. No free water encountered.	

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

A USCS LOG OF TEST HOLE 20-017 SCAMMON BAY BFU.GPJ HDL MODIFIED.GDT 10/15/20

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # HA-03

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Northwest quadrant of gravel pad*
Lat/Long: *61.84111/-165.57191*
Elevation:

Equipment Type: *Hand tools*
Drilling Method:
Field Crew:

Total Depth: *2.3 feet*
Date: *9/23/2020*
Geologist: *J.LaBelle*

Depth (Feet)	Sample Data: Sample Type	Sample Data: Number	Sample Data: Blow Count	Sample Data: Sample	Sample Data: Recovery	Sample Data: N-Value	USCS Classification Bonded Zone	Soil Graphic	Ground Water Data			SUBSURFACE MATERIAL
									Depth in (ft.)			
									Time			
									Date			
									Symbol			
0	GRAB	S-1					sm					SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, F3 0.0
												P200 =16.5%, Sa =67.9%, Gr =15.6%, Moisture =8.9%
1	GRAB	S-2										1.2
												SAND, fine to coarse; some silt; little gravel, fine to coarse; brown, dry to moist, large cobbles encountered, F3
												P200 =19.2%, Sa =73.3%, Gr =7.5%, Moisture =9.4%
2	GRAB	S-3										Moisture =9.3% 2.3
								BOH 2.3				Notes:
												Terminated hand auger at approximately 2.3 feet bgs due to hand tool refusal on cobbles. No free water encountered.

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # HA-04

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Northeast quadrant of gravel pad*
Lat/Long: *61.84113/-165.57156*
Elevation:

Equipment Type: *Hand tools*
Drilling Method:
Field Crew:

Total Depth: *2.1 feet*
Date: *9/23/2020*
Geologist: *J.LaBelle*

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	Ground Water Data			SUBSURFACE MATERIAL	
									Depth in (ft.)				
									Time				
									Date				
									Symbol				
0	GRAB	S-1					sm					SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, F3	0.0
												P200 =17.1%, Sa =59.7%, Gr =23.2%, Moisture =10.1%	0.3
1												cobbles present enocuntered; difficult digging	
	GRAB	S-2										Moisture =18.7%	1.6
2								BOH 2.1					2.1

Notes:
Terminated hand auger at approximately 2.1 feet bgs due to hand tool refusal on cobbles. No free water encountered.

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # TP-01

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *East of proposed retail sales building*
Lat/Long: *61.84069/-165.57198*
Elevation:

Equipment Type: *Case CX80C*
Drilling Method:
Field Crew: *City of Scammon Bay*

Total Depth: *8.5 feet*
Date: *9/23/2020*
Geologist: *J. LaBelle*

Ground Water Data		
Depth in (ft.)		
Time		
Date		
Symbol		

Depth (Feet)	Sample Data: Sample Type	Sample Data: Number	Sample Data: Blow Count	Sample Data: Sample	Sample Data: Recovery	Sample Data: N-Value	USCS Classification Bonded Zone	Soil Graphic	SUBSURFACE MATERIAL
0	GRAB	S-1					sm		SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, large cobbles encountered; excavator chattering while digging, F3 P200 =18.8%, Sa =64.4%, Gr =16.8%, Moisture =8.0%
2.5	GRAB	S-2							little gravel, fine to coarse; gray
3.5									SAND, fine to coarse; little gravel, fine to coarse; some silt; with garbage
4	GRAB	S-3					sm		SAND, (sm); fine to coarse; some to with gravel, fine to coarse; some silt; brown, dry to moist, cobbles encountered Moisture =8.6%
7.5									large boulders present in test pit; excavator chattering while digging
8.5								BOH 8.5	Notes: Terminated test pit at approximately 8.5 feet bgs due to excavator refusal on boulders. No free water encountered.

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # TP-02

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Near truck fill*
Lat/Long: *61.84072/-165.57243*
Elevation:

Equipment Type: *Case CX80C*
Drilling Method:
Field Crew: *City of Scammon Bay*

Total Depth: *9.0 feet*
Date: *9/23/2020*
Geologist: *J. LaBelle*

Ground Water Data		
Depth in (ft.)	8.5	
Time		
Date	9/23/20	9/23/20
Symbol	▽	

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	SUBSURFACE MATERIAL	
0									ORGANIC MAT	0.0
	GRAB	S-1					sm		SAND, (sm); fine to coarse; with gravel, fine to coarse; some silt; gray, dry to moist, cobbles and boulders encountered, F3 P200 =16.4%, Sa =50.3%, Gr =33.3%, Moisture =12.0%	0.5
1									SAND, fine to coarse; little gravel, fine to coarse; some silt; with garbage	1.5
							sm		SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, cobbles and boulders encountered	1.8
2										
3									increase in large boulders; difficult digging	3.0
4										
5										
6	GRAB	S-2							moist, F3 P200 =15.5%, Sa =65.0%, Gr =19.5%, Moisture =9.5%	6.5
7										
8										8.5
	GRAB	S-3					gp-gm		Poorly-graded GRAVEL, (gp-gm); fine to coarse; with sand, fine to coarse; little to some silt; brown, wet Moisture =13.2%	9.0
9								BOH 9	Notes: Terminated test pit at approximately 9.0 feet bgs due to free water collapsing hole.	

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

A USCS LOG OF TEST HOLE 20-017 SCAMMON BAY BFU.GPJ HDL MODIFIED.GDT 10/15/20

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # TP-03

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Near southwest side of gravel pad*
Lat/Long: *61.84102/-165.57237*
Elevation:

Equipment Type: *Case CX80C*
Drilling Method:
Field Crew: *City of Scammon Bay*

Total Depth: *8.5 feet*
Date: *9/23/2020*
Geologist: *J. LaBelle*

Ground Water Data		
Depth in (ft.)	5.5	
Time		
Date	9/23/20	9/23/20
Symbol	▽	

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	SUBSURFACE MATERIAL	
0	GRAB	S-1					sp-sm		ORGANIC MAT	0.0
									Poorly-graded SAND, (sp-sm); fine to coarse; little silt; trace gravel, fine to coarse; grayish-brown, dry to moist, F2 P200 =11.2%, Sa =84.7%, Gr =4.1%, Moisture =11.8%	0.3
1									boulders encountered	1.0
2										
3										
4										
5	GRAB	S-2					sm			5.5
6									SAND, (sm); fine to coarse; with gravel, fine to coarse; little silt; brown, wet, boulders and cobbles encountered, F2 P200 =13.9%, Sa =55.2%, Gr =30.9%, Moisture =16.0%	
7										
8								BOH 8.5		8.5
									Notes: Terminated test pit at approximately 8.5 feet bgs due to free water collapsing hole.	

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # TP-04

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Near northwest corner of gravel pad*
Lat/Long: *61.84146/-165.57198*
Elevation:

Equipment Type: *Case CX80C*
Drilling Method:
Field Crew: *City of Scammon Bay*

Total Depth: *1.5 feet*
Date: *9/23/2020*
Geologist: *J. LaBelle*

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	Ground Water Data			SUBSURFACE MATERIAL	
								Depth in (ft.)	1.5			
								Time				
								Date	9/23/20	9/23/20		
								Symbol	▽			
0											ORGANIC MAT	0.0
						sp						0.4
											Poorly-graded SAND, (sp); fine to coarse; some gravel, fine to coarse; little silt; brown, dry to moist, with garbage	
1											increase in garbage	0.8
	▽											1.5
							BOH 1.5				Notes: Terminated test pit at approximately 1.5 feet bgs due to presence of garbage.	

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

Sheet Number 1 of 1

A USCS LOG OF TEST HOLE 20-017 SCAMMON BAY BFU.GPJ HDL MODIFIED.GDT 10/15/20

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # TP-05

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Near northeast corner of gravel pad*
Lat/Long: *61.84134/-165.57109*
Elevation:

Equipment Type: *Case CX80C*
Drilling Method:
Field Crew: *City of Scammon Bay*

Total Depth: *2.5 feet*
Date: *9/23/2020*
Geologist: *J. LaBelle*

Depth (Feet)	Sample Data: Sample Type	Number	Blow Count	Sample Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	Ground Water Data			SUBSURFACE MATERIAL
								Depth in (ft.)			
								Time			
								Date			
								Symbol			
0											ORGANIC MAT — 0.0
						sp					0.6
1											Poorly-graded SAND, (sp); fine to coarse; some gravel, fine to coarse; little silt; brown, dry to moist, with garbage — 1.0
											increase in garbage
2											2.5
							BOH 2.5				Notes: Terminated test pit at 2.5 feet bgs due to presence of garbage. No free water encountered.

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop

HDL ENGINEERING Consultants LLC

LOG OF BORING

HOLE # TP-06

PROJECT NUMBER : *20-017*
PROJECT : *Scammon Bay Bulk Fuel Upgrades*
CLIENT : *Alaska Energy Authority*

Station / Location: *Near northeast side of gravel pad*
Lat/Long: *61.84119/-165.57086*
Elevation:

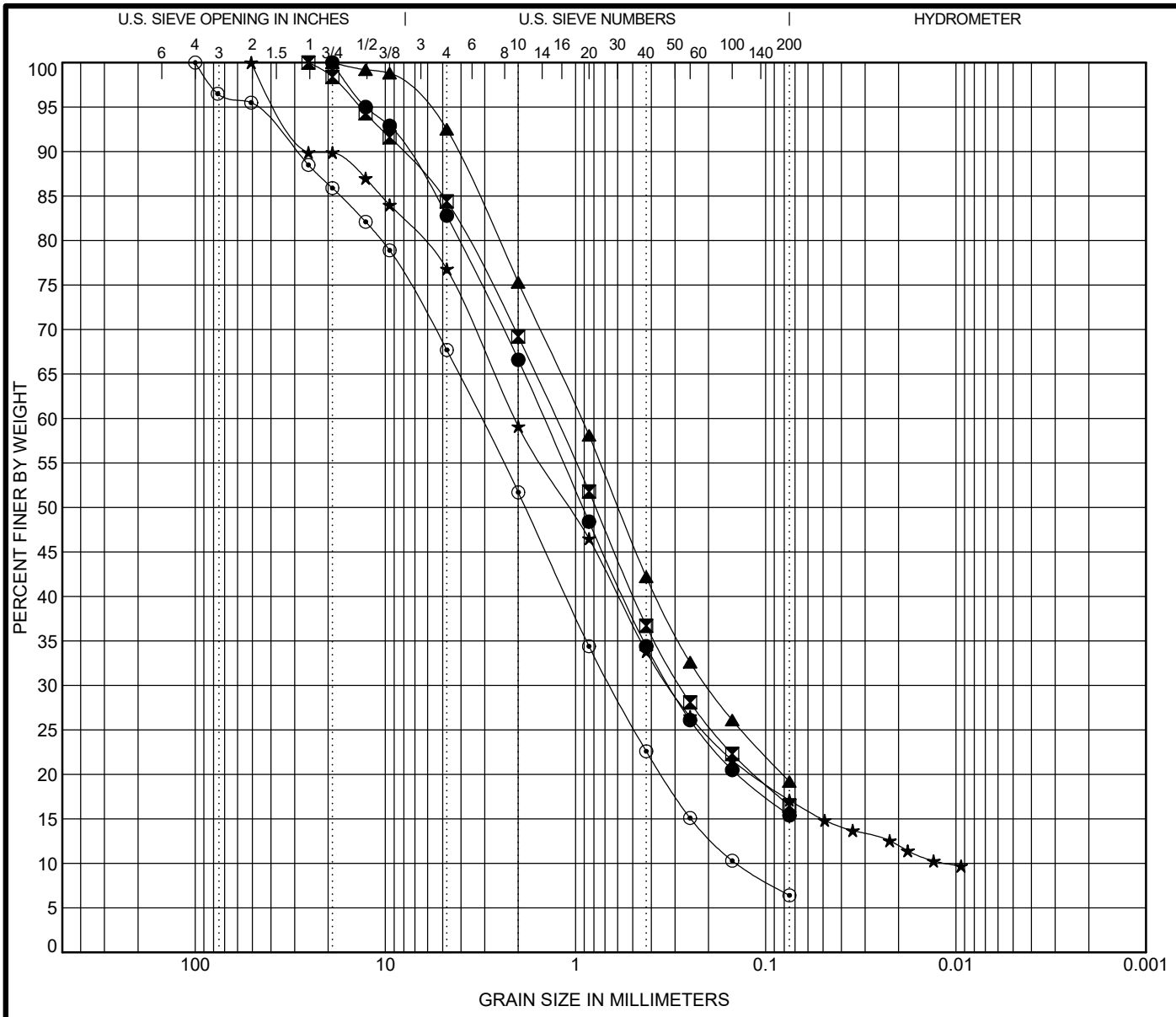
Equipment Type: *Case CX80C*
Drilling Method:
Field Crew: *City of Scammon Bay*

Total Depth: *11.5 feet*
Date: *9/23/2020*
Geologist: *J. LaBelle*

Depth (Feet)	Sample Type	Number	Blow Count	Sample	Recovery	N-Value	USCS Classification Bonded Zone	Soil Graphic	SUBSURFACE MATERIAL
0	GRAB	S-1					sm		ORGANIC MAT 0.0 SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, F3 0.2 P200 =25.5%, Sa =57.4%, Gr =17.1%, Moisture =14.8%
1							sm		SAND, (sm); fine to coarse; some gravel, fine to coarse; some silt; brown, dry to moist, with garbage 1.0 decrease in garbage 1.5
2									
3									boulders and cobbles encountered 3.5
4	GRAB	S-2					sm		SAND, (sm); fine to coarse; with silt; some gravel, fine to coarse; brown, dry to moist, cobbles and boulders encountered, F3 4.0 P200 =35.0%, Sa =40.0%, Gr =25.0%, Moisture =20.7%
5									
6									
7									
8									
9									
10	GRAB	S-4 S-3					sm		SAND, (sm); fine to coarse; with silt; gray, dry to moist 9.5 Moisture =29.0% 9.8 little gravel, fine to coarse; trace organics; P200 =47.7%, Sa =47.0%, Gr =5.3%, Moisture =28.9%
11								BOH 11.5	11.5 Notes: Terminated test pit at 11.5 feet bgs due to limits of excavator reach. No free water encountered.

Ground Water Data		
Depth in (ft.)		
Time		
Date		
Symbol		

☐ Auto Hammer ☐ Cathead Rope Method ☐ 140 lb. hammer with 30 in. drop ☐ 340 lb. hammer with 30 in. drop



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	**HA-02 DEPTH 0.0**						
⊠	**HA-03 DEPTH 0.0**						
▲	**HA-03 DEPTH 1.2**						
★	**HA-04 DEPTH 0.0**					**4.44**	**186.62**
⊙	**MS-01 DEPTH 0.0**					**0.97**	**22.03**

Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**HA-02 DEPTH 0.0**	**19**	**1.466**	**0.321**		**17.2**	**67.4**	**15.4**	
⊠	**HA-03 DEPTH 0.0**	**25.4**	**1.272**	**0.281**		**15.6**	**67.9**	**16.5**	
▲	**HA-03 DEPTH 1.2**	**19**	**0.934**	**0.204**		**7.5**	**73.3**	**19.2**	
★	**HA-04 DEPTH 0.0**	**50.8**	**2.09**	**0.322**	**0.011**	**23.2**	**59.7**	**17.1**	
⊙	**MS-01 DEPTH 0.0**	**100**	**3.133**	**0.656**	**0.142**	**28.8**	**61.3**	**6.4**	

HDL ENGINEERING Consultants LLC
3335 Arctic Blvd Ste 100
Anchorage, AK 99503
Telephone: 907-564-2120
Fax: 907-564-2122

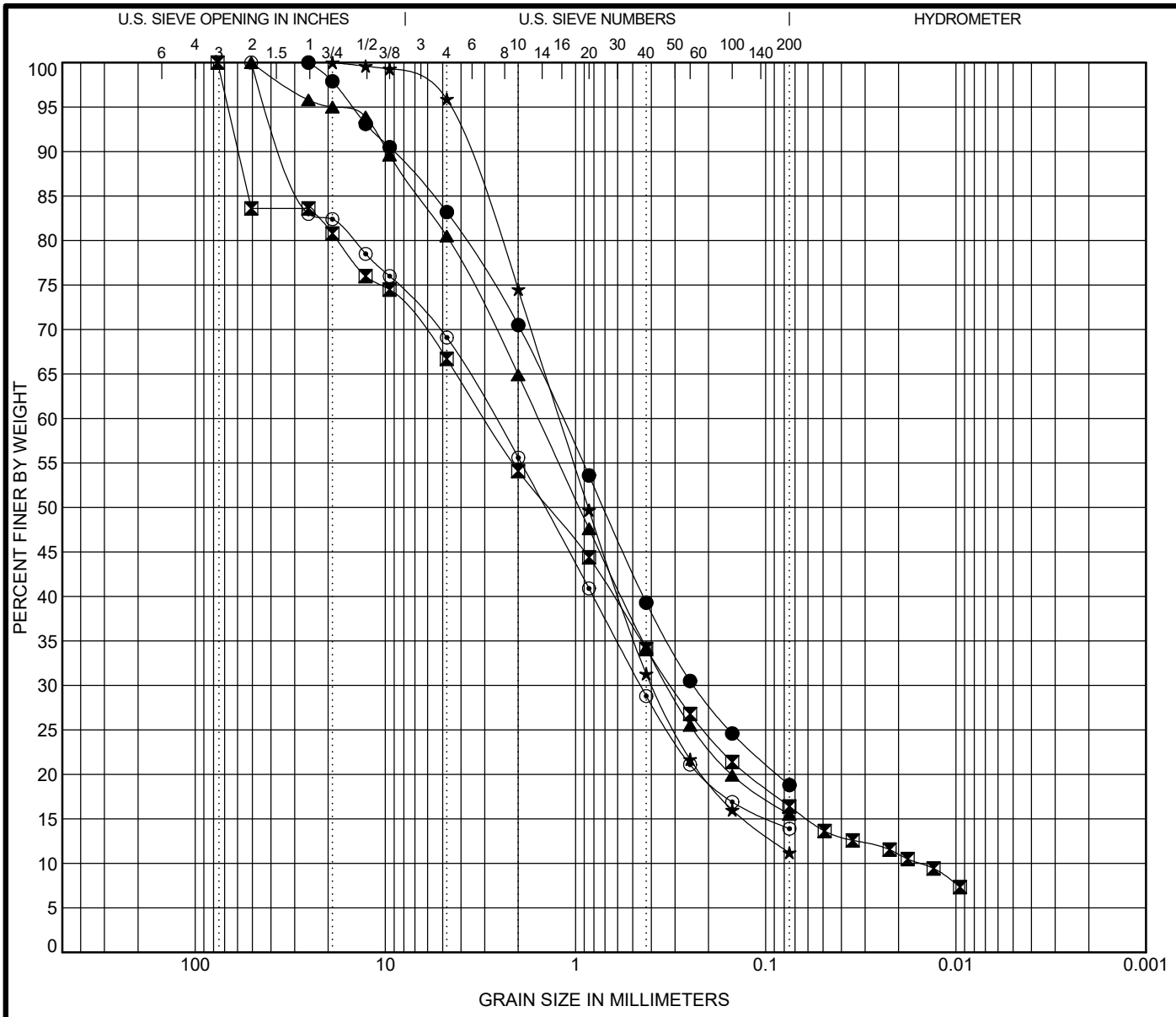
GRAIN SIZE DISTRIBUTION

Project: Scammon Bay Bulk Fuel Upgrades

Client: Alaska Energy Authority

Project Number: 20-017

US GRAIN SIZE 20-017 SCAMMON BAY BFU.GPJ HDL MODIFIED.GDT 10/26/20



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	**TP-01**	**DEPTH 0.0**						
⊠	**TP-02**	**DEPTH 0.5**					**2.14**	**193.64**
▲	**TP-02**	**DEPTH 6.5**						
★	**TP-03**	**DEPTH 0.3**					**2.05**	**19.23**
⊙	**TP-03**	**DEPTH 5.5**						

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	**TP-01**	**DEPTH 0.0**	**25.4**	**1.175**	**0.239**		**16.8**	**64.4**	**18.8**	
⊠	**TP-02**	**DEPTH 0.5**	**76.2**	**2.999**	**0.315**	**0.015**	**33.3**	**50.3**	**16.4**	
▲	**TP-02**	**DEPTH 6.5**	**50.8**	**1.57**	**0.329**		**19.5**	**65.0**	**15.5**	
★	**TP-03**	**DEPTH 0.3**	**19**	**1.213**	**0.396**		**4.1**	**84.7**	**11.2**	
⊙	**TP-03**	**DEPTH 5.5**	**50.8**	**2.651**	**0.455**		**30.9**	**55.2**	**13.9**	

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3335 Arctic Blvd Ste 100
Anchorage, AK 99503
Telephone: 907-564-2120
Fax: 907-564-2122

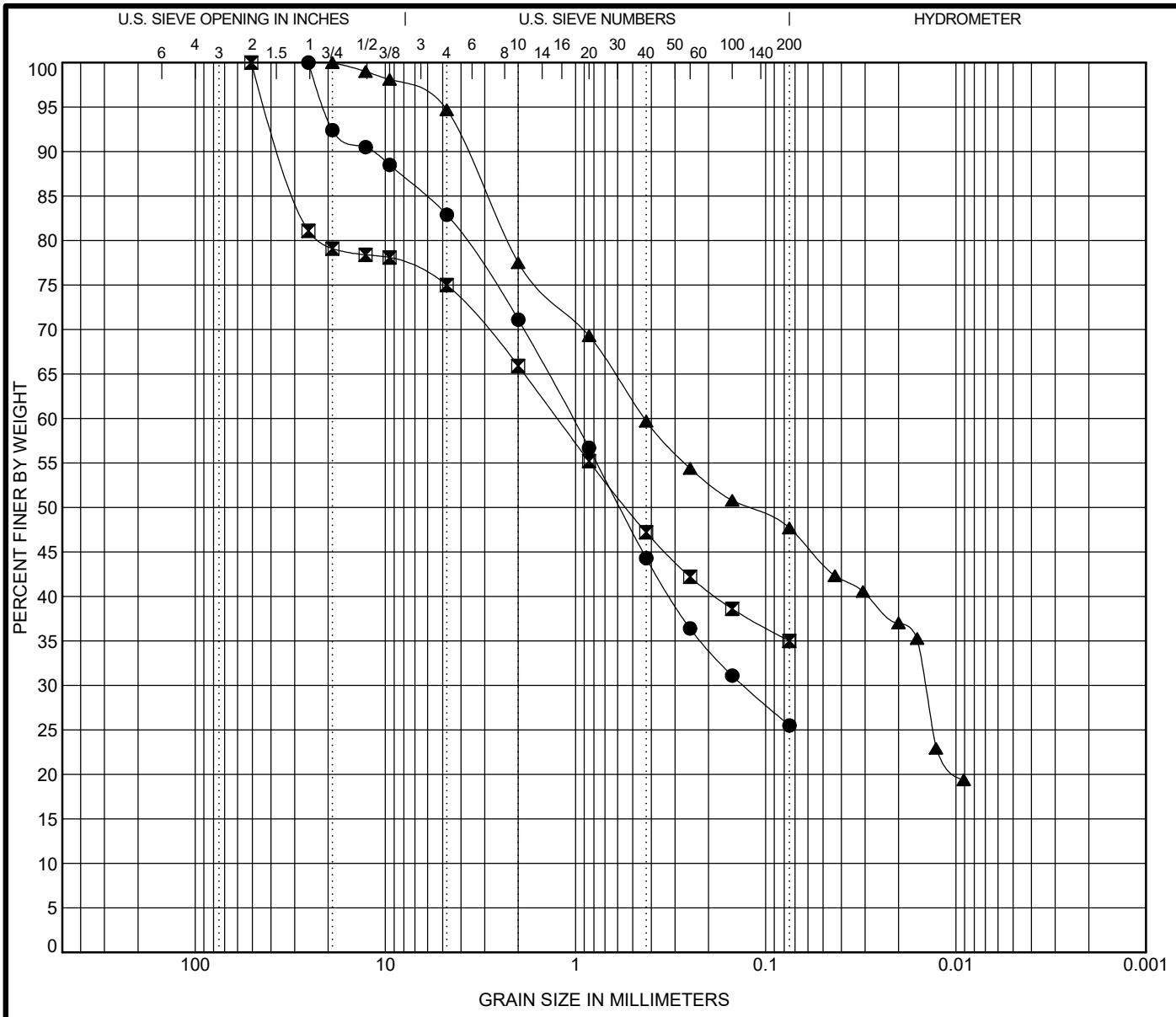
GRAIN SIZE DISTRIBUTION

Project: Scammon Bay Bulk Fuel Upgrades

Client: Alaska Energy Authority

Project Number: 20-017

US GRAIN SIZE 20-017 SCAMMON BAY BFU.GPJ HDL MODIFIED.GDT 10/26/20



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Classification	LL	PL	PI	Cc	Cu
●	TP-06	DEPTH 0.2						
⊠	TP-06	DEPTH 4.0						
▲	TP-06	DEPTH 9.8						

	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	TP-06	DEPTH 0.2	25.4	1.034	0.131		17.1	57.4	25.5	
⊠	TP-06	DEPTH 4.0	50.8	1.248			25.0	40.0	35.0	
▲	TP-06	DEPTH 9.8	19	0.434	0.014		5.3	47.0	47.7	

HDL ENGINEERING Consultants LLC
3335 Arctic Blvd Ste 100
Anchorage, AK 99503
Telephone: 907-564-2120
Fax: 907-564-2122

GRAIN SIZE DISTRIBUTION

Project: Scammon Bay Bulk Fuel Upgrades

Client: Alaska Energy Authority

Project Number: 20-017

APPENDIX D

Chemical Testing Results (5 pages)

Laboratory Analysis Report

Jacqueline Labelle
HDL Engineering Consultants, LLC
3335 Arctic Boulevard
Suite 100
Anchorage, Anchorage AK 99503

Work Order:	1205524
	20-017-2B Scammon Bay BFU
Client:	Hattenburg, Dilley & Linnell, LLC (HDL)
Report Date:	October 16, 2020

SGS maintains a formal Quality Assurance/Quality Control (QA/QC) program. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request. The laboratory certification numbers are AK00971 (DW Chemistry & Microbiology) & 17-021 (CS) for ADEC and 2944.01 for DOD ELAP/ISO 17025 (RCRA methods: 1020B, 1311, 3010A, 3050B, 3520C, 3550C, 5030B, 5035A, 6020B, 7470A, 7471B, 8015C, 8021B, 8082A, 8260D, 8270D, 8270D-SIM, 9040C, 9045D, 9056A, 9060A, AK101 and AK102/103). SGS is only certified for the analytes listed on our Drinking Water Certification (DW methods: 200.8, 2130B, 2320B, 2510B, 300.0, 4500-CN-C,E, 4500-H-B, 4500-NO3-F, 4500-P-E and 524.2) and only those analytes will be reported to the State of Alaska for compliance. Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP and, when applicable, other regulatory authorities.

*	The analyte has exceeded allowable regulatory or control limits.
!	Surrogate out of control limits.
B	Indicates the analyte is found in a blank associated with the sample.
CCV/CVA/CVB	Continuing Calibration Verification
CCCV/CVC/CVCA/CVCB	Closing Continuing Calibration Verification
CL	Control Limit
DF	Analytical Dilution Factor
DL	Detection Limit (i.e., maximum method detection limit)
E	The analyte result is above the calibrated range.
GT	Greater Than
ICV	Initial Calibration Verification
J	The quantitation is an estimation.
LCS(D)	Laboratory Control Spike (Duplicate)
LLQC/LLIQC	Low Level Quantitation Check
LOD	Limit of Detection (i.e., 1/2 of the LOQ)
LOQ	Limit of Quantitation (i.e., reporting or practical quantitation limit)
LT	Less Than
MB	Method Blank
MS(D)	Matrix Spike (Duplicate)
ND	Indicates the analyte is not detected.
RPD	Relative Percent Difference
TNTC	Too Numerous To Count
U	Indicates the analyte was analyzed for but not detected.

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.

SGS Ref.#	1205524001
Client Name	Hattenburg, Dilley & Linnell, LLC (HDL)
Project Name/#	20-017-2B Scammon Bay BFU
Client Sample ID	Fill Material
Matrix	Soil/Solid (dry weight)

Printed Date/Time	10/16/2020 12:16
Collected Date/Time	09/28/2020 10:00
Received Date/Time	10/07/2020 11:14
Technical Director	**Stephen C. Ede**

Sample Remarks:

Parameter	Results	LOQ	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Characterization									
pH	6.70	0.00100	pH units	SW9045D	A			10/09/20	S.S
Waters Department									
Chloride	ND	2.17	mg/kg	SW9056A	A		10/12/20	10/13/20	EWW
Resistivity	254	0.0200	ohm-m	SM19 2510A	A		10/15/20	10/15/20	EWW
Sulfate	4.55	2.17	mg/kg	SW9056A	A		10/12/20	10/13/20	EWW
Solids									
Total Solids	91.6		%	SM21 2540G	A			10/08/20	H.M

SGS

SGS North America Inc.
CHAIN OF CUSTODY RECORD

1205524

PH 366032 XD

www.us.sgs.com

Instructions: Sections 1 - 5 must be filled out.
Omissions may delay the onset of analysis.

Page ____ of ____

Section 1

CLIENT: HDL ENGINEERING CONSULTANTS

CONTACT: JACQUELINE LABELLE

PHONE #: 708-751-1716

PROJECT NAME: SCAMMON BAY BFU

PROJECT/ PWSID/ PERMIT#: 20-017-2B

REPORTS TO: JACQUELINE LABELLE

E-MAIL: JLABELLE@HDLalaska.com

Profile #:

INVOICE TO: SAME

QUOTE #:

P.O. #:

Section 2

RESERVED for lab use	SAMPLE IDENTIFICATION	DATE mm/dd/yy	TIME HH:MM	MATRIX/ MATRIX CODE	# CONTAINERS	Comp Grab MI (Multi-incremental)	Analysis*										REMARKS/LOC ID
							* pH	x Chloride	x Resistivity	x Sulfate							
1A	Fill Material	09/28/20	10:00 am														

NOTE: *The following analyses require specific method and/or compound list: BTEX, Metals, PFAS

Section 3

Preservative

Section 4

DOD Project? Yes No

Data Deliverable Requirements:

Cooler ID: _____

Section 5

Relinquished By:	Date	Time	Received By:
(1) Jacqueline LaBelle	10/7/20	11:20	
(2)			
(3)	~~Date~~	~~Time~~	~~Received By:~~
(4)	10/7/20	1114	Received For Laboratory By:

Requested Turnaround Time and/or Special Instructions:

* Per client for reference under WO: # 1143542

ma 10/7/20

Temp Blank °C: _____

or Ambient [ ]

Chain of Custody Seal: (Circle)

INTACT BROKEN (ABSENT)

Delivery Method: Hand Delivery [ ] Commerical Delivery [ ]

3 of 5

e-Sample Receipt Form

SGS Workorder #: **1205524** | 1205524

Review Criteria	Condition (Yes, No, N/A)	Exceptions Noted below
Chain of Custody / Temperature Requirements		Yes — Exemption permitted if sampler hand carries/delivers.
Were Custody Seals intact? Note # & location	N/A	
COC accompanied samples?	Yes	
DOD: Were samples received in COC corresponding coolers?	N/A	
N/A **Exemption permitted if chilled & collected <8 hours ago, or for samples where chilling is not required		
Temperature blank compliant* (i.e., 0-6 °C after CF)?	No	Cooler ID: N/A @ Ambient °C Therm. ID: N/A
If samples received without a temperature blank, the "cooler temperature" will be documented instead & "COOLER TEMP" will be noted to the right. "ambient" or "chilled" will be noted if neither is available.		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
		Cooler ID: @ °C Therm. ID:
*If >6°C, were samples collected <8 hours ago?	No	
If <0°C, were sample containers ice free?	N/A	
Note: Identify containers received at non-compliant temperature . Use form FS-0029 if more space is needed.		Proceed with sample above temp
Holding Time / Documentation / Sample Condition Requirements		Note: Refer to form F-083 "Sample Guide" for specific holding times.
Were samples received within holding time?	Yes	
Do samples **match COC**** (i.e.,sample IDs,dates/times collected)?	Yes	
**Note: If times differ <1hr, record details & login per COC.		
***Note: If sample information on containers differs from COC, SGS will default to COC information		
Were analytical requests clear? (i.e., method is specified for analyses with multiple option for analysis (Ex: BTEX, Metals)	No	Analysis filled out by SGS per previous workorder per client
	N/A	***Exemption permitted for metals (e.g,200.8/6020A).
Were proper containers (type/mass/volume/preservative***)used?	Yes	
Volatile / LL-Hg Requirements		
Were Trip Blanks (i.e., VOAs, LL-Hg) in cooler with samples?	N/A	
Were all water VOA vials free of headspace (i.e., bubbles ≤ 6mm)?	N/A	
Were all soil VOAs field extracted with MeOH+BFB?	N/A	

Note to Client: Any "No", answer above indicates non-compliance with standard procedures and may impact data quality.

Additional notes (if applicable):

Sample Containers and Preservatives

Container Id	Preservative	Container Condition	Container Id	Preservative	Container Condition
1205524001-A	No Preservative Required	OK			

Container Condition Glossary

Containers for bacteriological, low level mercury and VOA vials are not opened prior to analysis and will be assigned condition code OK unless evidence indicates than an inappropriate container was submitted.

OK - The container was received at an acceptable pH for the analysis requested.
BU - The container was received with headspace greater than 6mm.
DM - The container was received damaged.
FR - The container was received frozen and not usable for Bacteria or BOD analyses.
IC - The container provided for microbiology analysis was not a laboratory-supplied, pre-sterilized container and therefore was not suitable for analysis.
NC- The container provided was not preserved or was under-preserved. The method does not allow for additional preservative added after collection.
PA - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt and the container is now at the correct pH. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
PH - The container was received outside of the acceptable pH for the analysis requested. Preservative was added upon receipt, but was insufficient to bring the container to the correct pH for the analysis requested. See the Sample Receipt Form for details on the amount and lot # of the preservative added.
QN - Insufficient sample quantity provided.

APPENDIX E

Cost Estimate

Budget Cost Estimate
Scammon Bay Bulk Fuel Tank Farm
Earthen Dike Alternative

	Item	Estimated Quantity	Description	Unit Price ($)	Subtotal ($)
			Mobilization and Demobilization		
	1	1 Sum	Project Management	75,000	75,000
	2	1 Sum	Mobilization/Demobilization	250,000	250,000
	3	1 Sum	Camp Facilities	300,000	300,000
	4	1 Sum	Quality Control	15,000	15,000
	5	1 Sum	Project Closeout	25,000	25,000
					$ 665,000
			Civil Site Work		
	1	1 Sum	Survey, Erosion/Sediment Control, Traffic Control	25,000	25,000
	2	1 Acre	Clearing and Grubbing	5,000	5,000
	3	667 SY	Cellular Confinement Grid	18	12,006
	4	1 Sum	Decomission and Clean Existing Tanks	100,000	100,000
	5	1 Sum	Remove Piping, Structures, & Tanks	75,000	75,000
	6	16,000 CY	Furnish and Install Classfied Fill	32	512,000
	7	1,700 SY	Furnish and Install Geotextile Fabric	18	30,600
	8	1,890 SY	Furnish and Install Containment Liner	25	47,250
	9	5,670 SY	Furnish and Install Nonwoven Tank Farm Liner	14	79,380
	10	500 CY	Furnish and Install Surfacing Course	250	125,000
	11	700 LF	Furnish and Install Chainlink Fence	135	94,500
	12	15 CY	Concrete Tank and Pump Box Foundations	5,000	75,000
	13	500 CY	Furnish and Install Drain Rock	150	75,000
	14	105 CY	Furnish and Install Concrete Stabalized Fill	150	15,750
	15	22 Each	Furnish and Install Bollards	2,500	55,000
	16	850 LF	Sump Piping and Drains	50	42,500
	17	4,000 SY	Topsoil and Seed	12	48,000
			Civil Site Work Subtotal		**$ 1,416,986**
			Tank Construction and Installation		
	1	7 Each	Furnish and Install 27,000-gallon tanks	110,000	770,000
	2	1 Each	Furnish and Install 12,000-gallon tank	75,000	75,000
	3	1 Each	Furnish and Tank Appurtenances	60,000	60,000
	4	1 Each	Tank Farm Signage	15,000	15,000
			Tank Construction and Installation Subtotal		**$ 920,000**
			Fabricated Items Construction and Installation		
	1	1 Each	Furnish and Install Dispenser Enclosure	25,000	25,000
	2	1 Each	Furnish and Install Truck Fill Enclosure	25,000	25,000
	3	1 Each	Furnish and Install Truck Fill Containment	85,000	85,000
	4	1 Each	Furnish and Install Retail Sales Building	35,000	35,000
	5	1 Each	Furnish and Install Pump Box	15,000	15,000
	6	2 Each	Furnish and Install Stairs and Landings	25,000	50,000
			Fabricated Items Construction and Installation Subtotal		**$ 235,000**

Budget Cost Estimate
Scammon Bay Bulk Fuel Tank Farm
Earthen Dike Alternative

			Coatings			
	1	1 Sum		Field Finish Coat Steel Tank Touchup	5,000	5,000
	2	1 Sum		Field Finish Coat Piping	12,000	12,000
				Coatings Subtotal		**$ 17,000**
			Mechanical			
	1	800 LF		Supply Fuel Piping	15	12,000
	2	800 LF		Install Fuel Piping	20	16,000
	3	1 Sum		Supply Fuel Piping Valves	40,000	40,000
	4	1 Sum		Install Fuel Piping Valves	20,000	20,000
	2	2 Each		Supply Fuel Pump	1,600	3,200
	3	2 Each		Install Fuel Pump	800	1,600
	4	2 Each		Supply Fuel Transfer Pump	1,600	3,200
	5	2 Each		Install Fuel Transfer Pump	800	1,600
	3	1 Sum		Supply Fuel Dispenser	75,000	75,000
	4	1 Sum		Install Fuel Dispenser	15,000	15,000
	5	1 Sum		Furnish and Install Custody Meter	7,500	7,500
	6	1 Sum		Furnish and install Hose Reel and Nozel	6,000	6,000
				Mechanical Subtotal		**$ 201,100**
			Electrical			
	1	1 Sum		Electrical Service and Power Distribution	75,000	75,000
	2	1 Sum		AVEC Line Extension	25,000	75,000
	3	1 Sum		Lighting	45,000	75,000
	4	1 Sum		Control Panel, Instrumentation, Controls, and Wiring	210,000	75,000
	5	1 Sum		Grounding	32,000	75,000
	6	1 Sum		Point of Sale Building Electrical and Console	35,000	75,000
	7	1 Sum		Miscellaneous Electrical	40,000	75,000
				Electrical Subtotal		**$ 525,000**
			Stormwater Pollution and Prevention Plan			
	1	1 Sum		Stormwater Pollution and Prevention Plan	20,000	20,000
				SWPPP Subtotal		**$ 20,000**
			Spill Response			
	1	1 Sum		Spill Response Plan	9,000	9,000
	2	1 Sum		Supply Spill Reponse Equipment	28,500	28,500
	3	1 Sum		Install Spill Response Equipment	3,700	3,700
				Spill Response Subtotal		**$ 41,200**
				Subtotal Construction		**$ 4,041,286**
				Land Acquisition		$0
				AEA Administration	@ 5%	$ 202,100
				Construction Administration	@ 6%	$ 242,500
				Project Contingency	@ 15%	$ 606,200
				0 Years Inflation	@ 2%	$0
				Total		**$5,092,086**

Budget Cost Estimate
Scammon Bay Bulk Fuel Tank Farm
Timber Dike Alternative

	Item	Estimated Quantity	Description	Unit Price ($)	Subtotal ($)
			Mobilization and Demobilization		
	1	1 Sum	Project Management	75,000	75,000
	2	1 Sum	Mobilization/Demobilization	250,000	250,000
	3	1 Sum	Camp Facilities	300,000	300,000
	4	1 Sum	Quality Control	15,000	15,000
	5	1 Sum	Project Closeout	25,000	25,000
					$ 665,000
			Civil Site Work		
	1	1 Sum	Survey, Erosion/Sediment Control, Traffic Control	25,000	25,000
	2	1 Acre	Clearing and Grubbing	5,000	5,000
	3	1 Sum	Decomission and Clean Existing Tanks	100,000	100,000
	4	1 Sum	Remove Piping, Structures, & Tanks	75,000	75,000
	5	12,000 CY	Furnish and Install Classfied Fill	32	384,000
	6	1,500 SY	Furnish and Install Geotextile Fabric	18	27,000
	7	1,800 SY	Furnish and Install Containment Liner	25	45,000
	8	5,400 SY	Furnish and Install Nonwoven Tank Farm Liner	14	75,600
	9	500 CY	Furnish and Install Surfacing Course	250	125,000
	10	700 LF	Furnish and Install Chainlink Fence	135	94,500
	11	15 CY	Concrete Tank and Pump Box Foundations	5,000	75,000
	12	500 CY	Furnish and Install Drain Rock	150	75,000
	13	22 Each	Furnish and Install Bollards	2,500	55,000
	14	850 LF	Sump Piping and Drains	50	42,500
	15	3,750 LF	Topsoil and Seed	12	45,000
			Civil Site Work Subtotal		**$ 1,248,600**
			Tank Construction and Installation		
	1	7 Each	Furnish and Install 27,000-gallon tanks	110,000	770,000
	2	1 Each	Furnish and Install 12,000-gallon tank	75,000	75,000
	3	1 Each	Furnish and Tank Appurtenances	60,000	60,000
	4	2 Each	Tank Farm Signage	15,000	30,000
			Tank Construction and Installation Subtotal		**$ 935,000**
			Fabricated Items Construction and Installation		
	1	1 Each	Furnish and Install Dispenser Enclosure	25,000	25,000
	2	1 Each	Furnish and Install Truck Fill Enclosure	25,000	25,000
	3	1 Each	Furnish and Install Truck Fill Containment	85,000	85,000
	4	1 Each	Furnish and Install Retail Sales Building	35,000	35,000
	5	1 Each	Furnish and Install Pump Box	15,000	15,000
	6	2 Each	Furnish and Install Stairs and Landings	25,000	50,000
	7	1 Sum	Furnish and Install Timber Dike Walls	200,000	200,000
			Fabricated Items Construction and Installation Subtotal		**$ 435,000**

Budget Cost Estimate
Scammon Bay Bulk Fuel Tank Farm
Timber Dike Alternative

			Coatings			
	1	1 Sum		Field Finish Coat Steel Tank Touchup	5,000	5,000
	2	1 Sum		Field Finish Coat Piping	12,000	12,000
				Coatings Subtotal		**$ 17,000**
			Mechanical			
	1	800 LF		Supply Fuel Piping	15	12,000
	2	800 LF		Install Fuel Piping	20	16,000
	3	1 Sum		Supply Fuel Piping Valves	40,000	40,000
	4	1 Sum		Install Fuel Piping Valves	20,000	20,000
	2	2 Each		Supply Fuel Pump	1,600	3,200
	3	2 Each		Install Fuel Pump	800	1,600
	4	2 Each		Supply Fuel Transfer Pump	1,600	3,200
	5	2 Each		Install Fuel Transfer Pump	800	1,600
	3	1 Sum		Supply Fuel Dispenser	75,000	75,000
	4	1 Sum		Install Fuel Dispenser	15,000	15,000
	5	1 Sum		Furnish and Install Custody Meter	7,500	7,500
	6	1 Sum		Furnish and install Hose Reel and Nozel	6,000	6,000
				Mechanical Subtotal		**$ 201,100**
			Electrical			
	1	1 Sum		Electrical Service and Power Distribution	75,000	75,000
	2	1 Sum		AVEC Line Extension	25,000	25,000
	3	1 Sum		Lighting	45,000	45,000
	4	1 Sum		Control Panel, Instrumentation, Controls, and Wiring	210,000	210,000
	5	1 Sum		Grounding	32,000	32,000
	6	1 Sum		Point of Sale Building Electrical and Console	35,000	35,000
	7	1 Sum		Miscellaneous Electrical	40,000	40,000
				Electrical Subtotal		**$ 462,000**
			Stormwater Pollution and Prevention Plan			
	1	1 Sum		Stormwater Pollution and Prevention Plan	20,000	20,000
				SWPPP Subtotal		**$ 20,000**
			Spill Response			
	1	1 Sum		Spill Response Plan	9,000	9,000
	2	1 Sum		Supply Spill Reponse Equipment	35,000	35,000
	3	1 Sum		Install Spill Response Equipment	3,700	3,700
				Spill Response Subtotal		**$ 47,700**
				Subtotal Construction		**$ 4,031,400**
				Land Acquisition		$0
				AEA Administration	@ 5%	$ 201,600
				Construction Administration	@ 6%	$ 241,900
				Project Contingency	@ 15%	$ 604,700
				0 Years Inflation	@ 2%	$0
				Total		**$5,079,600**